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THE AGRICULTURAL OUTLOOK.

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THE WORLD CORN CROP.

By CHARLES M. DAUGHERTY.

Indian corn, or maize, although the last of the great cereals to be discovered, is now grown over a broader extent of the earth's surface than any other grain, excepting wheat. Originally merely the primitive food grain of the aborigines of tropical and semitropical regions of the Western Hemisphere, its cultivation has within a few centuries extended to all Continents; the exceptional productivity of the plant, in both corn and fodder, and the manifold uses made of grain, stalk, pith, leaves, and cob have won for it the fame of being America's most valuable contribution to agriculture.

In so far as can be determined from existing statistics, the world's recorded corn acreage amounts at present to approximately 170 million acres. As, however, no figures are extant respecting the area planted in many of the smaller producing States of Central and South America, Asia, Africa, and numerous islands, the recorded acreage doubtless falls short of the actual by several million acres.

The bulk of the world's crop, as is well known, is grown in America, where the plant is believed to have originated. Roundly 130 million acres are planted annually in the principal producing countries of America; of this upward of 105 million are in the United States, over 13 million in Mexico, 10 million in Argentina, and almost a million acres in Uruguay, Canada, and Chile combined. In the United States corn, measured by the surface devoted to its culture, is far and away the leading crop; the annual acreage is more extensive than the total surface under all other cereals. The annual yield

in good years surpasses in magnitude the combined wheat and barley crops of the whole of Europe. Doubtless the most striking feature of the crop, however, is that the enormous production is absorbed almost in entirety by the home demand. In spite of an increase since 1897 of 25 million acres in the area planted, exports, which in that year attained the maximum of 189 million bushels, have since almost steadily declined, and in 1913 amounted to only 45 million bushels. The tremendous increase in domestic consumption suggested by these facts is further emphasized by the incident that during 1913 over 5 million bushels were added to the home supply by imports from Argentina—a movement probably due in part to the coincidence of a change in fiscal regulations governing importation of corn into the United States with a heavy shortage in the domestic crop, the 1913 yield being only 2,445,000,000 bushels, compared with 3,125,000,000 bushels in the preceding year.

To compare the vast extent of land under corn in the United States with that in other countries serves little purpose other than to illustrate the heavy monopoly of this industry by the United States. Mexico is second among all corn-growing countries in point of acreage. The production (although the tortilla, a food made from parched corn, constitutes the chief subsistence of the masses) is insufficient for domestic needs, and several million bushels annually are imported from the United States. In Argentina corn culture has in recent years made great strides. From 3 million acres in 1900, plantings have been rapidly extended, and a recent estimate of the Argentine Department of Agriculture puts the land seeded for the crop maturing in the spring of 1914 at 10,250,000 acres. A distinctive feature of corn growing in Argentina is that the bulk of the crop is raised for export. Preeminently a pastoral country, the vast fields of alfalfa, and a mild climate that permits grazing in a great part of the pastoral zone practically the year round, minimize the demand for corn as an animal food; considerably less than 100 million bushels meets annual domestic requirements for all purposes. As during the past two years the production has amounted, respectively, to 296 million and 197 million bushels, Argentina has figured as the most important single source of supply for the great importing nations of Europe. Exports to all countries out of the banner crop of 1912 amounted to 190 million bushels. If the present rate of increase in culture be maintained, the Republic would doubtless be in a situation eventually to supply single handed the entire import demand of all European States. Much of the Argentine corn is of the flint variety.

In the Eastern hemisphere the principal maize-growing regions are southern Europe, Asia, the Mediterranean countries of Africa, and the Union of South Africa. In southern Europe the crop is grown for the grain on an expanse of territory extending from west to east

across the entire continent and reaching northward from the Mediterranean and Black Seas to latitudes including Switzerland and a small part of southern Germany. The value of the luxuriant semitropical foliage of the plant has, moreover, extended its cultivation for fodder into countries where the seasons of warm sunshine are too short for the grain to mature, and hence maize is grown for forage to a greater or less extent in many countries of northern Europe, even as far north as Scotland. In southern Europe the crop is cultivated for grain on an aggregate of about 30 million acres, the total annual production usually ranging between 600 million and 700 million bushels. The variety raised is for the most part the small-grained yellow flint, designated by English-speaking people as "round maize" in distinction from the "flat" or large-grained dent variety, consisting of white and yellow mixed, which reaches European markets from the United States. In Portugal, corn, known in the vernacular as milho, is cultivated on a much larger scale than any other cereal and constitutes, among other uses, the chief food of the peasant class. Spain and France have each over a million acres under maize. Concentrated in the northern part of the former country and southern part of the latter there are extensive districts where it is the chief grain cultivated and the principal reliance of the peasants for human food. Granoturco, the Italian name for corn, is grown annually in Italy on an extent of about 4 million acres, and in two provinces, Lombardy and Venetia, on a somewhat more extensive scale than is wheat; polenta, a dish prepared from corn, is in parts of the Kingdom the staff of life of the masses. Upward of a million bushels are raised annually in Greece, and in 1910 the annual output of European Turkey was officially returned at 22 million bushels. Corn culture in Europe, however, is largely centralized in a group of countries comprising Austria-Hungary, Roumania, Servia, Bulgaria, and in the southern governments of Russia. In this territory upward of 20 million acres are planted annually and the normal yield is approximately 500 million bushels. The important position the crop occupies in the agriculture of these countries is indicated by the fact that in Hungary proper, the principal corn-growing country of Europe, and in Bulgaria the acreage is second only to that of wheat, while in Roumania, where the grain is known as "porumb," and in Servia, where it is called "cucurza," it is more extensive than that of any other cereal. Excepting Austria-Hungary, whose annual production is a few million bushels short of domestic requirements, corn is grown in the rest of this territory in surplus quantities. Aggregate exports usually ranging between 50 million and 80 million bushels a year, are made from Roumania, Bulgaria, Servia, and Russia to Austria-Hungary, Italy, Spain, and, chiefly, to the nonproducing States of north Europe.

Outside of America and Europe the most extensive corn-growing area in the world is in Asia, notably in Turkey, southern Asiatic Russia, British India, French Indo-China, the Philippines, China, and Japan. Although the crop in none of these countries attains the proportions of a principal one, there are localities in most of them where its culture is of great local importance. In Asiatic Turkey an official report indicated over 900,000 acres under cultivation in 1910, and in 1911 a small area of 150,000 acres was returned in Asiatic Russia—in Ferghana, Samarkand, and Syr-Daria. In British India, where in some districts food made from corn is the chief article of native diet, over 6 million acres are planted yearly. An annual area of over one million acres is grown in the Philippines and upward of 130,000 acres in Japan. Statistical record of the area and yield in China and Indo-China is nonexistent. It is known, however, that the grain is grown to a considerable extent in parts of China, and in the northern part its value as a human and animal food is supplemented by the general use of the stalks as fuel. In the French colony, Indo-China, the growing popularity of the culture is indicated by the fact that the annual imports into the mother country from this possession increased from 571,000 to 3,710,000 bushels during the period 1906 to 1911.

Corn is grown quite generally on the Continent of Africa, but, excepting that it is an important article of food among the native tribes of the central colonies, definite information respecting the extent of its culture is limited to the countries along the Mediterranean and to the Union of South Africa. In Egypt, the principal producing country, the area (about 1,900,000 acres) is more extensive than that of cotton; the grain constitutes the chief food of the Egyptian fellah and enters almost wholly into domestic consumption. Small areas are also cultivated in Tunis, Algeria, Tripoli, and Morocco. In the Union of South Africa the raising of “mealies,” the local name for corn, has in late years been attracting much attention; the acreage, notably in Natal, has been much extended and, at the taking of the census of 1911, the total South African production was found to have increased to over 30 million bushels. In normal years a few million bushels are now available for export. Corn, it may be added, is grown on a small scale in the northern latitudes of Australia and New Zealand, and in many islands throughout the world for which few statistics are extant.

The world's corn production, in so far as accurate estimates are obtainable, is in magnitude practically equal to, and in one year at least has exceeded, that of wheat. The importance of the part taken by the United States in the industry is indicated by the fact that in 1911 the crop produced was upward of 72 and in 1912 over 71 per cent of the world's recorded production; in 1913, with a shortage of almost 678 million bushels in the domestic outturn, as compared with the previous

year, the domestic crop represents 68 per cent of the recorded crop of the world. Details, by countries, of the area and production of specified countries in 1913 and preceding years are given in Table 1:

TABLE 1.—*Corn crop of countries named, 1911-1913.*

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
NORTH AMERICA.						
United States.....	<i>Acres.</i> 105,825,000	<i>Acres.</i> 107,083,000	<i>Acres.</i> 105,820,000	<i>Bushels.</i> 2,531,488,000	<i>Bushels.</i> 3,124,746,000	<i>Bushels.</i> 2,446,993,000
Canada:						
Ontario.....	298,000	279,000	260,000	18,467,000	16,466,000	16,182,000
Quebec.....	23,000	19,000	15,000	712,000	476,000	586,000
Other.....	(¹)	(¹)	(¹)	6,000	8,000	5,000
Total Canada.....	321,000	298,000	278,000	19,185,000	16,950,000	16,773,000
Mexico.....	² 13,375,000	(³)	(³)	190,000,000	190,000,000	190,000,000
Total.....				2,740,673,000	3,331,696,000	2,653,771,000
SOUTH AMERICA.						
Argentina.....	7,945,000	8,456,000	9,464,000	27,675,000	295,849,000	196,642,000
Chile.....	46,000	56,000	(³)	1,221,000	1,527,000	1,200,000
Uruguay.....	498,000	(³)	(³)	3,643,000	8,000,000	4,000,000
Total.....				32,539,000	305,376,000	201,842,000
EUROPE.						
Austria-Hungary:						
Austria.....	748,000	752,000	705,000	11,856,000	15,053,000	13,280,000
Hungary proper.....	6,090,000	6,022,000	6,422,000	137,423,000	176,694,000	194,299,000
Croatia-Slavonia.....	1,024,000	1,065,000	(³)	24,006,000	24,166,000	24,000,000
Bosnia-Herzegovina.....	510,000	549,000	(³)	8,416,000	8,555,000	7,480,000
Total Austria-Hungary.....	8,372,000	8,388,000		181,701,000	224,468,000	239,059,000
Bulgaria.....	1,562,000	(³)	(³)	30,589,000	30,000,000	30,000,000
France.....	1,049,000	1,177,000	(³)	16,860,000	23,733,000	22,000,000
Italy.....	4,066,000	3,938,000	3,888,000	93,680,000	98,668,000	108,388,000
Portugal.....	(³)	(³)	(³)	15,000,000	15,000,000	15,000,000
Roumania.....	3,153,000	5,138,000	5,305,000	110,712,000	103,921,000	118,104,000
Russia:						
Russia proper.....	3,177,000			67,842,000		
Northern Caucasia.....	759,000			14,087,000		
Total Russia.....	⁴ 3,936,000	⁴ 4,086,000	⁴ 4,233,000	⁴ 81,929,000	⁴ 79,964,000	⁴ 72,870,000
Servia.....	1,443,000	1,446,000	(³)	26,531,000	22,833,000	23,621,000
Spain.....	1,145,000	1,149,000	1,105,000	28,730,000	25,069,000	25,140,000
Total.....				585,732,000	623,656,000	654,182,000
ASIA.						
British India (including native States).....	6,312,000	(³)	(³)	(³)	(³)	(³)
Japan.....	132,000	136,000	(³)	3,550,000	(³)	(³)
Philippine Islands.....	747,000	840,000	988,000	² 4,277,000	(³)	(³)
AFRICA.						
Algeria.....	39,000	31,000	24,000	554,000	374,000	394,000
Egypt.....	1,840,000	1,903,000	(³)	67,903,000	60,857,000	57,500,000
Union of South Africa.....	(³)	(³)	(³)	30,830,000	⁵ 30,830,000	⁵ 30,830,000
Total.....				99,287,000	92,061,000	88,724,000
AUSTRALASIA.						
Australia:						
Queensland.....	181,000	154,000	(³)	4,601,000	3,752,000	(³)
New South Wales.....	213,000	168,000	(³)	7,833,000	4,649,000	(³)

¹ Less than 500 acres.² Estimate for 1910.³ No official statistics.⁴ Includes Asiatic Russia (10 Governments of).⁵ Census figures of 1911 repeated.

TABLE 1.—*Corn crop of countries named, 1911-1913—Continued.*

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
AUSTRALASIA—continued.						
Australia—Continued.	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
Victoria.....	20,000	18,000	(1)	1,013,000	818,000	(1)
Western Australia.....	(1)	(1)	(1)	1,000	(1)	(1)
South Australia.....	1,000	(2)	(1)	7,000	2,000	(1)
Total Australia.....	415,000	340,000	315,000	13,455,000	9,221,000	8,620,000
New Zealand.....	13,000	6,000	5,000	478,000	278,000	220,000
Total Australasia....	428,000	346,000	320,000	13,933,000	9,499,000	8,840,000
Grand total.....				3,479,991,000	4,362,288,000	3,607,359,000

¹ No official statistics.² Less than 500 acres.TABLE 2.—*Total production of corn in countries named in Table 1, 1894-1913.*

Year.	Production.	Year.	Production.	Year.	Production.	Year.	Production.
	<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>
1894.....	1,671,307,000	1899.....	2,724,100,000	1904.....	3,109,252,000	1909.....	3,563,226,000
1895.....	2,834,750,000	1900.....	2,792,561,000	1905.....	3,461,181,000	1910.....	4,031,630,000
1896.....	2,964,435,000	1901.....	2,366,883,000	1906.....	3,963,645,000	1911.....	3,479,991,000
1897.....	2,587,206,000	1902.....	3,187,311,000	1907.....	3,420,321,000	1912.....	4,362,288,000
1898.....	2,682,619,000	1903.....	3,066,506,000	1908.....	3,606,931,000	1913.....	3,607,359,000

CORN FROM ARGENTINA.

By FRANK ANDREWS.

RECENT IMPORTS.

In September last a large increase occurred in the relatively small imports of corn into the United States, the new traffic coming chiefly from Argentina. Occasional imports had been made in former years. In the year ended June 30, 1909, the United States imported 258,000 bushels, of which 195,000 bushels came from Argentina. The imports declined to about 118,000 in the next fiscal year and to 52,000 in the year ending June 30, 1911, increasing to about 53,000 in the following year. The imports during the fiscal year ending June 30, 1913, amounted to 903,000 bushels, of which 880,000 came from Argentina.

The imports in September, 1913, amounted to 522,000 bushels; in October, 473,000; in November, 1,633,000, and in December, 2,343,000 bushels. Of these amounts, Argentina furnished in September, 499,000 bushels; in October, 421,000; in November, 1,509,000, and in December, 2,173,000 bushels. Compared with the production of the United States these imports are relatively small. The entire crop of Argentina, ranging from 175,000,000 to 300,000,000 bushels annually, is only about 10 per cent of the average consumption in the United States.

Corn production and exports of Argentina and the United States are shown in Table 3. Here is illustrated the fact that the Argentine crop goes chiefly to foreign countries, while the United States crop, in still greater proportions, is consumed at home.

TABLE 3.—Comparison of Argentine and United States corn as to production, exports, and average value.

Year.	Argentina.		United States.		Average value ¹ of corn imported into the United Kingdom from 1909-1913.	
	Production.	Exports. ²	Production.	Exports, ² year beginning July 1.	Argentina.	United States.
	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Cents per bushel.</i>	<i>Cents per bushel.</i>
1909.....	177, 155, 000	89, 499, 359	2, 772, 376, 000	33, 128, 498	74	77
1910.....	175, 187, 000	104, 727, 358	2, 836, 260, 000	65, 614, 522	64	73
1911.....	³ 27, 675, 000	4, 928, 362	2, 531, 488, 000	41, 797, 291	63	63
1912.....	295, 849, 000	190, 459, 100	3, 124, 746, 000	50, 780, 143	71	83
1913.....	⁴ 196, 642, 000	⁴ 190, 000, 000	2, 446, 988, 000	.....	68	68

¹ The values of articles imported into the United Kingdom include the value in the country of origin, plus all costs of delivery to the United Kingdom. Hence, the two columns are comparable, since both apply to values in same country of destination.

² Including corn meal reduced to terms of corn.

³ Crop failure, due to drought.

⁴ Preliminary.

CORN PRICES.

Comparing values of Argentine with United States corn in the British market for the past five years, it is found that in three years out of the five United States corn is valued considerably higher than Argentine. But in 1911 and in 1913 the average values of the consignments from each of these countries were the same in the British markets.

A considerable part of the corn imported into the United States from Argentina is received at New York, and it was sold in that city in November and December, 1913, at prices ranging from 73 to 80 cents a bushel, or several cents under the prices of the No. 2 yellow grade of United States corn in that market.

A comparison of prices of Argentine corn with other corn at New York, with the contract grade at Chicago, with the average farm price in the United States of all kinds of corn, and with the average export value in Argentina of the corn imported here from that country, is shown in Table 4.

It is to be understood that the imports for these last months of 1913 consisted of old corn, which was harvested in the winter or spring of 1912-13. Attention is invited also to the marked fluctuations in the import values of this Argentine corn, ranging from under 60 cents in September to over 80 cents a bushel in October; falling to 72 in November, and further to 62 cents a bushel in December.

TABLE 4.—*Comparative cash prices in the United States of Argentine and domestic corn, September to December, 1913.*

[Cents per bushel.]

Year and month.	Average import value of Argentine corn. ¹	Average farm price of corn in U. S. on 1st of month.	Wholesale price at New York, N. Y.				Wholesale prices at Chicago, Ill., "contract" grade corn.	
			No. 2 yellow corn.		Argentine corn.			
			Low.	High.	Low.	High.	Low.	High.
1913.	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>
September.....	59.7	75.4	79.5	86.2	.....	.....	71.5	78.5
October.....	80.3	75.3	76.0	80.2	.....	.....	68.0	73.2
November.....	72.0	70.7	79.0	85.0	77.5	77.5	71.5	76.2
December.....	62.2	69.1	73.0	85.0	73.2	80.0	65.5	78.5

¹ Average declared wholesale value in Argentina of corn imported into the United States from that country.

OCEAN AND RAILROAD FREIGHT RATES.

During the last three months of 1913 the rates paid for full cargoes of corn from Argentina to New York were from 6 to 7½ cents per bushel when shipped from San Lorenzo, an upriver port on the River Plate, and from 5 to 5½ cents when shipped from Rosario, a port farther down that river. Rates to Galveston ranged from 5 to 7½ cents, and one rate was quoted to San Francisco from Buenos Aires at about 9½ cents per bushel.

The rates on corn to New York from Chicago, over the cheapest routes for a number of years, have not been far different from the rates of the last few months of 1913 to New York from San Lorenzo, and have been a cent or two higher a bushel than the rates from the lower River Plate. In fact, corn is shipped from Rosario, Argentina, to New York for about the same rate as is charged by rail from Buffalo to New York. However, the lake rate from Chicago to Buffalo is frequently as low as 1 cent per bushel, and rarely averages 2 cents for a season.

To Galveston the rates of the last few months of 1913 were considerably lower from the upriver ports of Argentina than from Kansas City. The rate from Kansas City to Galveston in 1913 was 9.8 cents per bushel, while 3 out of 4 rates from Argentina to Galveston were less than 7 cents, one of them being as low as 5.1 cents per bushel. The ocean rates quoted in this article apply to full cargoes; that is, where a ship is chartered to carry corn only. Regular lines of steamships, where smaller lots than full cargoes are carried, often charge lower rates than are paid on full cargoes of corn.

The freight rates on grain from the Atlantic coast of the United States westward are considerably higher than for the eastbound traffic, since relatively small lots of grain are shipped westward. Corn shipped by rail from New York to Chicago would be charged 14 cents per bushel. Hence it would cost from 19 to 21½ cents per bushel

to pay the freight on corn shipped from Argentina to Illinois, by way of New York, at the rates quoted at the close of 1913. This cost applies only to ocean freight from Argentina plus railroad freight in the United States and excludes any costs of transfer.

Ocean freight rates on corn to Liverpool from Buenos Aires were from 6 to 10 cents per bushel and from San Lorenzo from 8 to about 12½ cents a bushel for the last few months of 1913. Early in October, 1913, two vessels were chartered to carry corn from Rosario—one to New York and the other to Liverpool. The cargo for New York was charged at the rate of 5.4 cents per bushel and the cargo for Liverpool at the rate of 6 cents per bushel. The time from Buenos Aires to New York is about the same as from Buenos Aires to Liverpool. Fast steamers often make the voyage over either route in 24 days, while some of the slower ones require 10 to 15 days longer. Of 10 different vessels arriving at New York with corn in November and December, 1913, 3 vessels brought more than 260,000 bushels each and all but 2 brought more than 100,000 bushels each. The largest cargo of these 10 consisted of 285,200 bushels. The two smaller loads were brought by ships which carried a large assortment of other cargo. One of these ships, which arrived on December 6, brought about 61,000 bushels of corn in about 24,000 bags, and the cargo included also nearly 11,000 quarters of beef, 4,100 carcasses of mutton, besides wool, sheepskins, tallow, hides, corned beef, miscellaneous meat products, etc.

ARGENTINE CORN.

By W. J. T. DUVEL, *Crop Technologist*.

Within the last few years increasing quantities of corn have been imported into the United States from the Argentine, most of which has been consigned to the Corn Products Refining Co., of New York, for manufacturing purposes. The importations, however, of the 1913 crop have exceeded those of former years, the total importations from July 1, 1913, to February 13, 1914, as reported by Bradstreet's, being 7,132,980 bushels, approximately 85 per cent of which was discharged at Atlantic ports, and the remainder at Gulf ports.

The Argentine being the corn belt of the Southern Hemisphere, the crop matures approximately six months in advance of corn in the United States, so that export shipments begin during the early part of June. The duration of the voyage from the Argentine to the United States under favorable conditions is approximately 30 days.

While the total production of corn in the Argentine under the most favorable conditions is considerably below the production in the State of Illinois, less than half of the Argentine crop is consumed within the Republic, so that the Argentine exports have greatly exceeded those of the United States during the past few years.

The Argentine corn is handled in burlap bags containing from 130 to 135 pounds, in contrast to the corn from the United States, which is exported mainly in bulk. The most common method of discharging cargoes at United States ports is to hoist with crane and tackle from 12 to 15 bags at a time and shift them to barges or lighters alongside the vessel, where the corn is inspected as the bags are opened. From 7 to 15 days are usually required to unload a cargo, depending largely on the condition and quantity of the corn and the weather.

QUALITY AND CONDITION OF ARGENTINE CORN.

Corn as grown in the Argentine consists almost exclusively of the hard, flinty varieties with medium to small kernels, mostly yellow in color. The character of the corn, having both small cobs and small kernels, results in a much lower moisture content in the Argentine shelled corn than is normally contained in the large dent varieties of the United States. As a result of the small size of the kernels, the Argentine corn can not carry, without increased danger of deterioration, as high a percentage of water as the larger dent corns of the United States. On the other hand, the hard and firm texture of the Argentine corn is such that it can be "conditioned" to much better advantage than our dent corns.

During the summer of 1912, through the courtesies of the Corn Products Refining Co. and the grain-inspection department of the New York Produce Exchange, several cargoes of corn from the Argentine were examined at the time of discharge at the port of New York. The average results of mechanical analyses on 157 samples from four of the cargoes, representing a total of 638,000 bushels, are contained in Table 5. The data shown in this table represents new corn of the crop of 1912.

TABLE 5.—Average quality and condition of four cargoes of Argentine corn, crop of 1912, as discharged at New York.

Steamship.	Date of arrival at New York.	Days in transit.	Number of samples taken.	Bushels in cargo.	Moisture content.	Weight per bushel.	Sound corn.	Dirt, chaff, cob, etc.
	1912				<i>Per cent.</i>	<i>Pounds.</i>	<i>Per cent.</i>	<i>Per cent.</i>
A.....	Oct. 19	35	55	180,000	14.55	60.87	93.84	0.10
B.....	July 8	27	48	260,000	14.80	60.10	95.28	.17
C.....	Aug. 4	45	28	66,000	17.02	57.75	63.74	.28
D.....	Aug. 5	34	26	132,000	15.43	60.01	90.02	.17
Total.....			157	638,000				
Average of 4 cargoes.....					15.10	60.05	90.50	.16

From Table 5 it will be seen that the average moisture content of the total 638,000 bushels was 15.1 per cent, the weight per bushel more than 60 pounds, the percentage of sound corn 90.5, and the dirt, chaff, cob, etc., approximately one-sixth of 1 per cent.

During the months of December, 1913, and January, 1914, samples to the number of 591 were secured from 16 different cargoes of Argentine corn as discharged at New York and at Gulf ports. The average moisture content of these samples (old corn of the 1913 crop) was 13.7 per cent, or 6.6 per cent less than the average moisture content of corn shipped from country stations in central Illinois during December, 1913, and January, 1914, the latter being new corn of the 1913 crop. From the standpoint of moisture content alone this represents a difference in value of approximately $5\frac{3}{4}$ cents per bushel, based on a New York price of about 70 cents per bushel, not giving consideration to the increased danger of deterioration of high-moisture corn. While the average moisture content of the Argentine corn is low, a considerable quantity is damaged, musty, sour, and heating when discharged. This is evidenced by the fact that of the 591 samples previously referred to, the maximum moisture content was 41.6 per cent, the minimum being 9.2 per cent.

Attention is also called to the distinctly inferior quality and condition of the corn from steamer C as shown in Table 15. This ship was twice delayed during transit as the result of accident, and some of the corn was in the ship more than 60 days, and some of it had become sea damaged and ship damaged. Excluding three samples which showed a moisture content of 32.7, 34.8, and 37 per cent, the average for the cargo would be 14.9 per cent.

WEEVIL IN ARGENTINE CORN.

A considerable quantity of Argentine corn is likewise infested with weevil. Samples of screenings from practically all of the cargoes have been submitted to Dr. F. H. Chittenden, in charge of Truck-Crop and Stored-Product Insect Investigations of the Bureau of Entomology, but no new species have been found.

CHEMICAL COMPOSITION.

A wide diversity of opinion exists as to the chemical composition of Argentine corn as compared with the dent varieties of the United States. While the data available are not sufficient to justify the drawing of any definite conclusions, the results of the chemical analyses of a limited number of samples of Argentine corn as discharged at New York indicate that the Argentine corn is superior, from the standpoint of chemical composition, to our dent corn as loaded for export at our Atlantic and Gulf ports, as shown in Table 6.

Table 6 shows the average results of the chemical analyses of 98 samples of Argentine corn, representing 4 cargoes with a total of 638,000 bushels of the crop of 1912, as discharged at New York, together with the average of the analyses of 129 samples of North American corn, representing two cargoes of the 1910 crop and two cargoes of the 1911 crop with a total of 910,146 bushels as loaded for export.

TABLE 6.—*Chemical composition of four cargoes of Argentine flint corn as discharged at New York and of four cargoes of North American dent corn as loaded for export, calculated to a water-free basis.*¹

Item.	Argentine corn crop of 1912 as imported at New York.	North American corn crops of 1910 and 1911 as loaded for export.
	<i>Per cent.</i>	<i>Per cent.</i>
Ash.....	1.72	1.43
Ether extract (oil).....	5.52	4.07
Protein.....	11.01	9.81
Crude fiber.....	1.99	2.18
Pentosans.....	6.02	6.19
Invert sugar.....	6.30	3.38
Sucrose.....	1.08	1.13
Acid calculated as acetic.....	.33	.28
Undetermined.....	72.03	74.53

¹ Chemical analyses of the individual samples made by Cattle Food and Grain Laboratory of the Bureau of Chemistry.

From Table 6 it will be seen that the ether extract or oil was approximately 1.5 per cent greater in the Argentine corn than in the United States corn, while the protein was 1.2 per cent greater. In the consideration of these analyses it is necessary to note that they represent commercial corn and are therefore not comparable with the analyses shown in textbooks, which are based on selected, hand-shelled samples.

THE WORLD OATS CROP.

By CHARLES M. DAUGHERTY.

The cultivation of oats on an extensive scale is an industry confined almost exclusively to the northern and central states of Europe, to the North Atlantic and North Central States of the United States, and to the Dominion of Canada. Of the 144 million acres which, as nearly as can be estimated, constitute the world's oats area, upward of 85 per cent is in the above-named territory. Elsewhere than in Europe and North America the cereal is not extensively produced. No statistical account exists of its culture in Asia, excepting in Asiatic Russia, where about 6 million acres a year are raised, and in Asiatic Turkey, where in 1910 about 300,000 acres were reported. In Africa, the crop flourishes only in Tunis, Algeria, and the Union of South Africa; in the two first-named colonies the total surface under this grain is only about a half million acres annually; in the last named, the census of 1911 returned an outturn of 9,661,000 bushels. In Argentina, Uruguay, and Chile, the only South American states that report crop acreages, the yearly sowings cover an extent of little more than 3 million acres. In fact, no country of the Southern Hemisphere figures pre-eminently as an oats grower; the area in the Australasian colonies even, where conditions might seem favorable to the development of

the industry, aggregates little more than a million acres. It is noteworthy, however, that lately its exploitation has attracted unusual attention in the Province of Buenos Aires, Argentina. Since 1908 seedings have expanded from less than a million to over 3 million acres; production, from 33 million bushels to 69 million in 1912 and to 116 million in 1913. As the grain is raised almost solely for shipment abroad, this single Province has suddenly taken rank second only to Russia as an exporter, 61 million bushels having been embarked thence in 1912 and 59 million in 1913.

The distribution of the oat area of the two principal producing Continents is about 85 million acres annually in Europe, 38½ million in the United States, and 10½ million in Canada. In Europe the oats belt lies almost wholly in latitudes north of those of upper Hungary, farmers to the south as a whole paying little attention, comparatively, to the crop. Of the entire European acreage, over 75 million acres lie north of the parallels above referred to, while in the southern countries, i. e., Portugal, Spain, Italy, Greece, Hungary, Roumania, Bulgaria, Servia, and Turkey, an annual total of less than 8 million acres is sown. Causes contributing to the partial centralization of the industry in north and central Europe are obvious. Summer oats, the principal variety sown, is peculiarly adapted to the shorter seasons of warm weather characteristic of northern latitudes. From time immemorial the grain has been in the more northerly parts of that Continent the favorite cereal food for animals, especially for horses. In addition to hay, barley, pulse, and the various root crops—swedes, turnips, mangolds, and potatoes—which are dug and fed there by millions of tons each year, oats has been, especially in winter, an indispensable article of provender. Increasing demand was a constant impulse to extension of native production. In modern times the animal ration has been modified, particularly in countries bordering on the English Channel, by extraordinarily heavy imports of oil-cake (including oil-seeds from which cake is manufactured), barley, locust beans, etc. Maize, though not so popular as an animal food, especially for swine, as in the United States, is also imported in great volume. Oats, however, has retained its traditional rank as a stock food and the tendency in many countries has been toward an expansion rather than a contraction of its culture. Moreover, the great European oat belt lies almost wholly in latitudes where maize will not mature, and hence the smaller grain occupies to some extent an economic position there as an indigenous livestock food similar to that held by corn in the United States.

Of the 85 million acres of oats in Europe, about 43 million are in Russia, 11 million in Germany, 10 million in France, 5 million in Austria, 4 million in the United Kingdom, 3 million in the Scandinavian states—Sweden, Norway, and Denmark—and 1 million in

Belgium and Netherlands combined. Relative to other grain cultivation, the crop in each of these countries presents features suggestive of dietary, economic, and commercial customs of the people. In the United Kingdom, Scandinavian states, and Austria a wider extent of land is devoted to oat cultivation than to any other cereal. The short growing season, the universal use of porridge as a breakfast dish in countries north of the English Channel, and the marked preference for the grain and straw as a food for some species of animals, have all contributed to give its culture a preeminent place in the agriculture of these countries. Production in the United Kingdom even then does not suffice for domestic needs. From 50 million to 60 million bushels a year are drawn from foreign sources. The French, the greatest consumers of wheat per capita in Europe, in efforts to make native supplies meet domestic requirements, devote a larger area to wheat than to any other cereal, with oats second. In each of the great rye-consuming nations, Germany and Netherlands, the surface annually under oats ranks next in breadth to that of their great bread grain. The premier oat-producing country of the world, however, is Russia; though the area is much less extensive than that of rye or wheat, it represents annually about half the entire European acreage under this cereal. The production, enormous in volume, is consumed for the most part by the native live stock, as is the case in most countries. Annual exports during the past few years have ranged between 58 million and 96 million bushels, consigned in the order of their importance as purchasers to the United Kingdom, Netherlands, Germany, France, and to other European countries.

On the North American Continent oats, measured by the extent cultivated, is the third cereal in importance in the United States and the second in Canada. Though the acreage in the United States is not so extensive as that of the Russian Empire, the total yield is superior, thereby giving the Republic rank by a small margin as the leading producer of the world; the normal annual output of each country is upward of a billion 32-pound bushels.

In late years the Canadian acreage has increased rapidly and is now almost equal to that of Germany; the increase, however, has been mostly in Saskatchewan and Alberta; in the Maritime Provinces and Manitoba the industry has made but moderate progress. Almost the entire North American crop is consumed on that continent. Excepting exports of 33 million bushels in 1912 from the United States, the quantities annually shipped abroad have never exceeded from 1 to 2 million bushels and imports have been of like negligible proportions. The record exports from Canada were 10½ million bushels in 1912-13; imports are practically nil.

In 1913 the so-called world's crop amounted to 4,672 million bushels, over 53 million more than that of the preceding year and the

largest ever harvested. In every producing country of noteworthy importance as a producer, yields were heavier than in 1912, excepting a falling off of near 300 million bushels in the United States. Table 7 gives the details of area and production for the past three years in all countries for which estimates are available. In making comparisons between certain countries it might be noted that in the case of a few—notably Austria, Denmark, France, Roumania, Great Britain, Australia, and New Zealand—production is stated in bushels of measure, for other countries in 32-pound bushels. As the measured bushel of oats—particularly in northern Europe—weighs on an average 39 pounds, the crop of a country measured by that standard would not show its real magnitude when compared with that of another country estimated in bushels of 32 pounds. Original statistics, in units of weight, however, are not obtainable for all countries.

TABLE 7.—Oat crop of countries named, 1911–1913.

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
NORTH AMERICA.						
United States.....	<i>Acres.</i> 37,763,000	<i>Acres.</i> 37,917,000	<i>Acres.</i> 38,399,000	<i>Bushels.</i> 922,298,000	<i>Bushels.</i> 1,418,337,000	<i>Bushels.</i> 1,121,768,000
Canada:						
New Brunswick.....	208,000	195,000	195,000	5,986,000	5,607,000	5,946,000
Quebec.....	1,430,000	1,296,000	1,303,000	37,500,000	33,516,000	39,025,000
Ontario.....	2,806,000	2,785,000	2,814,000	84,860,000	97,053,000	105,159,000
Manitoba.....	1,308,000	1,348,000	1,398,000	60,037,000	57,154,000	56,759,000
Saskatchewan.....	2,333,000	2,556,000	2,755,000	107,594,000	117,537,000	114,112,000
Alberta.....	1,221,000	1,461,000	1,639,000	59,034,000	67,630,000	71,542,000
Other.....	325,000	325,000	330,000	10,168,000	13,132,000	12,126,000
Total Canada.....	9,631,000	9,966,000	10,434,000	365,179,000	391,629,000	404,669,000
Mexico.....	(¹)	(¹)	(¹)	17,000	17,000	17,000
Total.....				1,287,494,000	1,809,983,000	1,526,454,000
SOUTH AMERICA.						
Argentina.....	1,980,000	2,548,000	2,946,000	47,192,000	69,169,000	115,879,000
Chile.....	58,000	69,000	(¹)	1,861,000	3,380,000	4,000,000
Uruguay.....	29,000	86,000	(¹)	590,000	1,825,000	2,000,000
Total.....				49,643,000	74,374,000	121,879,000
EUROPE.						
Austria-Hungary:						
Austria.....	4,641,000	4,613,000	4,707,000	135,143,000	146,376,000	160,091,000
Hungary proper.....	2,653,000	2,473,000	2,866,000	89,656,000	76,768,000	96,634,000
Croatia-Slavonia.....	247,000	239,000	256,000	5,554,000	3,311,000	6,163,000
Bosnia-Herzegovina.....	229,000	203,000	(¹)	5,405,000	4,766,000	5,981,000
Total Austria-Hungary.....	7,770,000	7,528,000	.....	235,758,000	231,221,000	268,869,000
Belgium.....	639,000	(¹)	(¹)	43,249,000	38,000,000	39,000,000
Bulgaria.....	447,000	(¹)	(¹)	10,421,000	11,500,000	12,000,000
Denmark.....	2,996,000	(¹)	(¹)	41,188,000	42,395,000	43,300,000
Finland.....	(¹)	(¹)	(¹)	22,642,000	26,618,000	27,219,000
France.....	9,863,000	9,840,000	9,881,000	303,328,000	313,656,000	322,131,000
Germany.....	10,694,000	10,841,000	10,967,000	530,764,000	586,987,000	669,231,000
Italy.....	1,270,000	1,254,000	1,251,000	40,973,000	28,306,000	43,469,000
Netherlands.....	342,000	341,000	342,000	17,724,000	16,317,000	20,000,000
Norway.....	2,264,000	(¹)	(¹)	8,593,000	11,607,000	11,734,000
Roumania.....	992,000	943,000	1,290,000	26,222,000	20,775,000	35,138,000

¹ No official statistics.² Area in 1907 (census).

TABLE 7.—Oat crop of countries named, 1911–1913—Continued.

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
EUROPE—continued.						
Russia:	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
Russia proper.....	38,398,000	.....	.....	690,753,000	.....	.....
Poland.....	2,894,000	.....	.....	78,465,000	.....	.....
Northern Caucasus.....	1,311,000	.....	.....	23,681,000	.....	.....
Total Russia (European).....	42,603,000	145,785,000	147,512,000	792,899,000	972,111,000	1,169,490,000
Servia.....	259,000	262,000	(2)	5,050,000	5,477,000	6,889,000
Spain.....	1,268,000	1,279,000	1,351,000	33,858,000	23,035,000	25,333,000
Sweden.....	1,952,000	(2)	(2)	63,462,000	75,900,000	86,000,000
United Kingdom:						
England.....	1,841,000	1,866,000	1,772,000	74,119,000	68,431,000	70,387,000
Wales.....	206,000	207,000	202,000	7,087,000	7,040,000	6,981,000
Scotland.....	964,000	956,000	938,000	36,751,000	37,928,000	37,148,000
Ireland.....	1,040,000	1,046,000	1,049,000	59,207,000	66,867,000	66,610,000
Total, United Kingdom.....	4,051,000	4,075,000	3,961,000	177,164,000	180,266,000	181,126,000
Total.....	.....	.....	.....	2,353,295,000	2,584,171,000	2,960,929,000
ASIA.						
Cyprus.....	(2)	(2)	(2)	466,000	419,000	500,000
Russia:						
Central Asia.....	1,024,000	.....	.....	12,197,000	.....	.....
Siberia.....	3,953,000	.....	.....	53,272,000	.....	.....
Trans-Caucasia.....	2,000	.....	.....	37,000	.....	.....
Total Russia (Asiatic).....	4,979,000	(3)	(3)	65,506,000	95,473,000	(3)
Total.....	.....	.....	.....	65,972,000	95,892,000	.....
AFRICA.						
Algeria.....	434,000	476,000	539,000	11,520,000	12,351,000	17,973,000
Tunis.....	148,000	124,000	(2)	4,650,000	2,067,000	4,134,000
Union of South Africa.....	(2)	(2)	(2)	9,661,000	49,661,000	49,661,000
Total.....	.....	.....	.....	25,831,000	24,079,000	31,768,000
AUSTRALASIA.						
Australia:						
Queensland.....	2,000	1,000	4,000	52,000	6,000	85,000
New South Wales.....	78,000	71,000	(2)	1,756,000	1,191,000	(2)
Victoria.....	393,000	302,000	(2)	10,005,000	4,730,000	(2)
South Australia.....	78,000	108,000	156,000	1,172,000	1,392,000	1,726,000
Western Australia.....	62,000	84,000	(2)	801,000	992,000	(2)
Tasmania.....	64,000	51,000	(2)	2,128,000	1,552,000	(2)
Total Australia.....	677,000	617,000	874,000	15,914,000	9,863,000	16,625,000
New Zealand.....	303,000	404,000	387,000	10,412,000	20,282,000	14,013,000
Total Australasia.....	980,000	1,021,000	1,261,000	26,326,000	30,145,000	30,638,000
Grand total.....	.....	.....	.....	3,808,561,000	4,618,644,000	4,672,168,000

¹ Includes Asiatic Russia (10 Governments of).² No official statistics.³ Included in European Russia.⁴ Repetition of 1911 census figures.

TABLE 8.—Total production of oats in countries named in Table 7, 1895–1913.

Year.	Production.	Year.	Production.	Year.	Production.	Year.	Production.
	<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>
1895.....	3,008,154,000	1900.....	3,166,002,000	1905.....	3,510,167,000	1910.....	4,182,410,000
1896.....	2,847,115,000	1901.....	2,862,615,000	1906.....	3,544,961,000	1911.....	3,808,561,000
1897.....	2,633,971,000	1902.....	3,626,303,000	1907.....	3,603,893,000	1912.....	4,618,644,000
1898.....	2,903,974,000	1903.....	3,378,034,000	1908.....	3,591,012,000	1913.....	4,672,168,000
1899.....	3,256,256,000	1904.....	3,611,302,000	1909.....	4,312,882,000		

OATS FROM CANADA.

By FRANK ANDREWS.

The increased importation of corn from Argentina has been accompanied by an unusual importation of oats from Canada into the United States. Relatively small consignments were received in July, August, and September, 1913, and with October a larger movement began. In that month the total imports of oats into the United States amounted to about 2,525,000 bushels, in November to 5,132,000, in December to 5,578,000, and in January, 1914, 2,959,000. All but a very small proportion of these imports was received from Canada, the amounts from other countries being but a few hundred bushels at the most in a month. The total imports during the four months ending January, 1914, amounted to over 16,000,000 bushels, or more than the total imports during the seven years beginning July 1, 1906, and ending June 30, 1913. The increased importation followed a short harvest. The oat crop of the United States in 1913 was 297,000,000 bushels under the crop of 1912, which, however, was the largest on record, and from which nearly 34,000,000 bushels were exported from the United States. In 1911 the short crop of 922,000,000 bushels was followed by an importation, chiefly from Canada, of 2,622,000 bushels. The crops, imports, and exports for a series of years are shown in Table 9.

The average farm price of oats in the United States on December 1, 1913, was 39.2 cents, or 7.3 cents per bushel above the corresponding price December 1, 1912. For the month of December, 1913, the cash prices of contract oats at Chicago ranged from $37\frac{3}{8}$ cents to $40\frac{1}{8}$ cents per bushel and in the corresponding month of 1912, $31\frac{1}{2}$ to $33\frac{3}{8}$ cents per bushel; the increase in price in December, 1913, was approximately the same both on the farms of the United States and at Chicago, the increase being not far from 7 cents per bushel. In 1910, when the crop was about 5 per cent greater than that of 1913, the price at Chicago in December ranged from 31 to $32\frac{1}{2}$ cents per bushel for contract oats, or about the same as in 1912, and the average farm price for the United States December 1, 1910, was 34.4 cents, or 2.5 cents above 1912. The 1910 crop was not low enough to invite imports to any extent, the total receipts from foreign countries in the 12 months following July 1, 1910, being slightly over 107,000 bushels. In the following year, however, when production dropped below 1 billion bushels, the farm price on December 1 rose to 45 cents per bushel, or about one-third more than in the preceding year; and the Chicago prices were from $45\frac{3}{4}$ to $47\frac{3}{8}$ cents per bushel, while the imports in the fiscal year beginning July 1, 1911, rose to 2,622,000 bushels, the highest figure for 3 years.

It is apparent, therefore, that the short crop and the large imports of oats for 1913 were not attended by a great increase of price in the United States.

TABLE 9.—*Production, exports, and imports of oats, for the United States, 1906–1913.*

Year.	Production.	Exports (domestic), 12 months beginning July 1.	Imports, 12 months beginning July 1.		
			From Canada.	From other countries.	Total.
	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
1906.....	964,905,000	4,014,042	72,707	1,845	74,552
1907.....	754,443,000	1,158,622	273,826	90,481	364,307
1908.....	807,156,000	1,510,230	5,047,636	1,619,353	6,666,989
1909.....	1,007,129,000	1,885,474	946,479	88,032	1,034,511
1910.....	1,186,341,000	2,044,912	97,062	10,256	107,318
1911.....	922,298,000	2,171,503	2,609,307	13,050	2,622,357
1912.....	1,418,537,000	33,759,177	708,033	15,866	723,899
1913.....	1,121,768,000				

The oat crop of Canada in 1908–1912 averaged 328,000,000 bushels a year, of which 2 per cent was exported. Hence the average yearly surplus of Canada was equal to only 0.6 of 1 per cent of the average crop of the United States. More than one-half of the Canadian production of 1908–1912 was harvested in the region extending from the crest of the Canadian Rocky Mountains to Lake Superior, and embraced in the Provinces of Alberta, Saskatchewan, and Manitoba. The crops of the Province of Ontario also were large ones, usually exceeding those of any single province except Saskatchewan; hence, the principal oat-producing regions of Canada border on the United States from eastern New York to western Idaho, and are connected by convenient rail or water transportation with most of the leading grain markets of this country.

OTHER WORLD CROPS.

By CHARLES M. DAUGHERTY.

THE WORLD BARLEY CROP.

Barley has a remarkable adaptability to different environments. It is a favorite grain in a number of subtropical regions; is the second most important grain in Japan, and continues to hold its place in the countries of the ancient civilizations in western Asia and bordering the Mediterranean. Its cultivation in western Asia is mentioned in very ancient writings, and a wild, two-rowed barley is still found in Palestine that has been claimed to be the parent of the cultivated variety. Notwithstanding its apparent southern origin, it is grown more successfully than any other grain in extreme northern latitudes, being often the leading grain crop in such regions,

particularly in northern Europe and in Iceland. It grows also at very high elevations.

While barley is used largely for malting purposes, it forms the principal dependence for stock feed in northern regions not suitable for the growing of crops more generally appreciated as food for live stock. Its excellence for this purpose also assists to maintain its importance in the more southern latitudes.

Similarly, its use as an important human food, which in ancient times was very general, still persists in Japan, in western Asia, and in north Africa, while in districts of the north of Europe, where climatic conditions are too rigorous for other cereal crops, barley becomes the main dependence for bread, as does rye in the less extreme northern latitudes. Its use elsewhere is general, but not large, being most commonly utilized in the form of "pearl" barley for soups, etc.

Though the production of barley in this country, excepting that grown in the Pacific Coast States, is at present important only in those States settled largely by farmers from the northern regions of Europe familiar with the cultivation of this grain in their former home lands, it is a crop suitable for a large portion of the country, including the Southern States.

The production in the United States is increasing more rapidly than any of the other leading cereals. From 1870 to the banner cereal year 1912 it increased ninefold, against fourfold for oats, threefold for corn and wheat, and twofold for rye.

The international trade in barley is nearly one-third as large as that in wheat, but is material only for a few countries, almost two-thirds of that exported coming from Russia, and considerably more than half of the total imports being taken by Germany. German imports in 1913 were close to 150 million bushels, and those into Great Britain over 50 million. Exports from both countries are insignificant. The Netherlands imported over 40 million bushels, which, coupled with exports almost as great, show the movement to have been largely through, rather than merely into, that country. Belgium imported over 17 million bushels. Imports into other countries are of little moment.

Russia's contribution of about 177 million bushels to the international trade, in 1913 was supplemented by exports of about 30 million from the Netherlands, 17 from Roumania, 14 from Canada, 12 from the United States, 12 from Hungary, and 10 from India, with relatively small exports from other countries.

TABLE 10.—*Barley crop of countries named, 1911–1913.*

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
NORTH AMERICA.						
United States.....	<i>Acres.</i> 7, 627, 000	<i>Acres.</i> 7, 530, 000	<i>Acres.</i> 7, 499, 000	<i>Bushels.</i> 160, 240, 000	<i>Bushels.</i> 223, 824, 000	<i>Bushels.</i> 178, 189, 000
Canada:						
New Brunswick.....	3, 000	3, 000	2, 000	79, 000	74, 000	74, 000
Quebec.....	100, 000	94, 000	89, 000	2, 271, 000	2, 226, 000	2, 263, 000
Ontario.....	520, 000	512, 000	485, 000	13, 722, 000	15, 093, 000	14, 589, 000
Manitoba.....	448, 000	481, 000	496, 000	14, 949, 000	15, 826, 000	14, 305, 000
Saskatchewan.....	274, 000	232, 000	332, 000	8, 661, 000	9, 575, 000	10, 421, 000
Alberta.....	164, 000	187, 000	197, 000	4, 356, 000	6, 179, 000	6, 334, 000
Other.....	13, 000	13, 000	12, 000	377, 000	405, 000	333, 000
Total Canada. ¹	1, 522, 000	1, 582, 000	1, 613, 000	44, 415, 000	49, 378, 000	48, 319, 000
Mexico.....	(¹)	(¹)	(¹)	6, 500, 000	6, 500, 000	7, 000, 000
Total.....				211, 155, 000	279, 702, 000	233, 508, 000
EUROPE.						
Austria-Hungary:						
Austria.....	2, 710, 000	2, 634, 000	2, 699, 000	69, 383, 000	74, 145, 000	75, 923, 000
Hungary proper.....	2, 736, 000	2, 603, 000	2, 866, 000	73, 596, 000	70, 140, 000	75, 845, 000
Croatia-Slavonia.....	158, 000	156, 000	158, 000	2, 640, 000	1, 978, 000	2, 956, 000
Bosnia-Herzegovina.....	180, 000	220, 000	(¹)	2, 970, 000	2, 857, 000	3, 904, 000
Total Austria-Hungary.....	5, 784, 000	5, 613, 000	.....	148, 589, 000	149, 120, 000	158, 628, 000
Belgium.....	83, 000	84, 000	84, 000	4, 445, 000	4, 316, 000	4, 142, 000
Bulgaria.....	621, 000	(¹)	(¹)	12, 390, 000	10, 000, 000	10, 000, 000
Denmark.....	² 578, 000	(¹)	(¹)	21, 016, 000	22, 872, 000	23, 000, 000
Finland.....	(¹)	(¹)	(¹)	6, 631, 000	6, 759, 000	6, 368, 000
France.....	1, 908, 000	1, 877, 000	1, 890, 000	47, 631, 000	49, 079, 000	48, 370, 000
Germany.....	3, 917, 000	3, 928, 000	4, 087, 000	145, 132, 000	159, 924, 000	188, 709, 000
Italy.....	612, 000	604, 000	620, 000	10, 882, 600	8, 403, 000	10, 803, 000
Netherlands.....	69, 000	66, 000	66, 000	3, 416, 000	3, 364, 000	3, 286, 000
Norway.....	² 89, 000	(¹)	(¹)	2, 550, 000	3, 086, 000	3, 202, 000
Roumania.....	1, 253, 000	1, 235, 000	1, 390, 000	26, 157, 000	21, 295, 000	27, 339, 000
Russia:						
Russia proper.....	23, 013, 000	.....	.....	320, 959, 000	.....	.....
Poland.....	1, 240, 000	.....	.....	27, 938, 000	.....	.....
Northern Caucasia.....	3, 836, 000	.....	.....	55, 296, 000	.....	.....
Total Russia (European) ³	28, 089, 000	⁴ 28, 873, 000	⁴ 31, 197, 000	404, 193, 000	⁴ 464, 200, 000	⁴ 574, 118, 000
Servia.....	255, 000	257, 000	(¹)	4, 609, 000	4, 777, 000	3, 445, 000
Spain.....	3, 567, 000	3, 298, 000	3, 869, 000	86, 792, 000	59, 994, 000	68, 772, 000
Sweden.....	446, 000	(¹)	(¹)	13, 725, 000	13, 660, 000	17, 000, 000
United Kingdom:						
England.....	1, 337, 000	1, 365, 000	1, 470, 000	43, 378, 000	42, 897, 000	49, 337, 000
Wales.....	87, 000	92, 000	90, 000	2, 729, 000	2, 839, 000	2, 788, 000
Scotland.....	174, 000	192, 000	198, 000	6, 489, 000	7, 117, 000	7, 598, 000
Ireland.....	158, 000	165, 000	173, 000	7, 039, 000	7, 259, 000	8, 004, 000
Total United Kingdom.....	1, 756, 000	1, 814, 000	1, 931, 000	59, 695, 000	60, 112, 000	67, 727, 000
Total.....				997, 853, 000	1, 040, 961, 000	1, 214, 919, 000
ASIA.						
British India.....	7, 840, 000	(¹)	(¹)	(¹)	(¹)	(¹)
Cyprus.....	(¹)	(¹)	(¹)	2, 229, 000	2, 049, 000	2, 100, 000
Japanese Empire:						
Japan.....	3, 173, 000	3, 132, 000	3, 296, 000	86, 468, 000	90, 559, 000	101, 073, 000
Formosa.....	3, 000	(¹)	(¹)	46, 000	45, 000	46, 000
Total Japanese Empire.....				86, 514, 000	90, 604, 000	101, 119, 000

¹ No official statistics.² Area in 1907 (Census).³ Exclusive of winter barley.⁴ Includes Asiatic Russia (10 Governments of).

TABLE 10.—*Barley crop of countries named, 1911-1913—Continued.*

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
ASIA—continued.						
Russia:	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
Central Asia.....	420,000	.....	.....	5,694,000	.....	.....
Siberia.....	451,000	.....	.....	4,300,000	.....	.....
Transcaucasia.....	2,000	.....	.....	27,000	.....	.....
Total Russia (Asiatic) ¹	873,000	(²)	(²)	10,021,000	12,263,000	(²)
Total.....	.....	.....	.....	98,764,000	104,916,000	103,219,000
AFRICA.						
Algeria.....	3,320,000	3,430,000	3,152,000	47,588,000	32,887,000	50,031,000
Tunis.....	1,193,000	1,119,000	(³)	13,319,000	3,070,000	6,400,000
Union of South Africa.....	(³)	(³)	(³)	1,359,000	4,359,000	41,359,000
Total.....	.....	.....	.....	62,266,000	37,316,000	57,790,000
AUSTRALASIA.						
Australia:						
Queensland.....	6,000	2,000	9,000	86,000	16,000	151,000
New South Wales.....	7,000	11,000	(³)	85,000	133,000	⁵ 133,000
Victoria.....	53,000	53,000	(³)	1,383,000	1,057,000	⁵ 1,057,000
South Australia.....	34,000	41,000	69,000	562,000	725,000	1,360,000
Western Australia.....	3,000	4,000	(³)	35,000	38,000	⁵ 38,000
Tasmania.....	5,000	6,000	(³)	147,000	153,000	⁵ 153,000
Total Australia.....	108,000	117,000	.....	2,298,000	2,122,000	2,892,000
New Zealand.....	34,000	32,000	37,000	950,000	1,296,000	1,420,000
Total Australasia.....	142,000	149,000	.....	3,248,000	3,418,000	4,312,000
Grand total.....	.....	.....	.....	1,373,286,000	1,466,313,000	1,613,748,000

¹ Exclusive of winter barley.² Included in European Russia.³ No official statistics.⁴ Figures for 1911 repeated.⁵ Figures for 1912 repeated.TABLE 11.—*Total production of barley in countries named in Table 10, 1895-1913.*

Year.	Production.	Year.	Production.	Year.	Production.	Year.	Production.
	<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>
1895.....	915,504,000	1900.....	959,622,000	1905.....	1,180,053,000	1910.....	1,388,734,000
1896.....	932,100,000	1901.....	1,072,195,000	1906.....	1,296,579,000	1911.....	1,373,286,000
1897.....	864,605,000	1902.....	1,229,132,000	1907.....	1,271,237,000	1912.....	1,466,313,000
1898.....	1,030,581,000	1903.....	1,235,786,000	1908.....	1,274,897,000	1913.....	1,613,748,000
1899.....	965,720,000	1904.....	1,175,784,000	1909.....	1,458,263,000		

THE WORLD RYE CROP.

The surface annually sown to rye in the world amounts approximately to 108 million acres; of this the heavy proportion of 95 per cent, or 103 million acres, is in Europe, the continent where the plant is believed to have originated. Native to the territory between the Black and Caspian Seas, its cultivation has expanded, partly because of an exceptional power of resistance to the damaging effects of rigorous winters, over large areas of central and northern Europe. In Russia, Austria, Germany, and the Netherlands the grain is grown over a broader extent of land than any other cereal, and to the great mass of the population of these countries the "black bread" made

from rye flour is the chief article of food. Other States in the rye belt—Denmark, Sweden, and Norway—though cultivating oats more than any other grain, give second place to rye. Rye cakes, especially in Sweden, are the great staple of consumption.

In the restriction of its culture on an important scale to a few European nations, rye is, among the great food grains, unique. In the countries mentioned above an aggregate of over 94 million acres are now sown annually, while in all other Europe the total area each year is less than 9 million. The cultivation on other continents is of small comparative importance. So far as statistics show, less than 3 million acres are grown in Asia, none in Africa, excepting about 20,000 acres in the Union of South Africa, only a few thousand acres in South America and Australia, and a total of less than 3 million acres in the United States and Canada.

TABLE 12.—*Rye crop of countries named, 1911–1913.*

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
NORTH AMERICA.						
United States.....	<i>Acres.</i> 2,127,000	<i>Acres.</i> 2,117,000	<i>Acres.</i> 2,557,000	<i>Bushels.</i> 33,119,000	<i>Bushels.</i> 35,664,000	<i>Bushels.</i> 41,381,000
Canada:						
Quebec.....	13,000	11,000	10,000	200,000	173,000	156,000
Ontario.....	97,000	93,000	85,000	1,728,000	1,711,000	1,567,000
Manitoba.....	5,000	5,000	5,000	104,000	105,000	103,000
Saskatchewan.....	2,000	3,000	3,000	61,000	57,000	68,000
Alberta.....	14,000	15,000	16,000	394,000	377,000	398,000
Other.....	(¹)	(¹)	(¹)	5,000	5,000	8,000
Total Canada.....	131,000	127,000	119,000	2,492,000	2,428,000	2,300,000
Mexico.....	(²)	(²)	(²)	70,000	70,000	70,000
Total.....				35,681,000	38,162,000	43,751,000
EUROPE.						
Austria-Hungary:						
Austria.....	4,995,000	5,021,000	4,853,000	105,269,000	119,620,000	109,099,000
Hungary proper.....	2,557,000	2,660,000	2,677,000	47,782,000	49,000,000	52,256,000
Croatia-Slavonia.....	176,000	188,000	167,000	2,541,000	1,350,000	2,553,000
Bosnia-Herzegovina.....	30,000	41,000	(²)	379,000	450,000	666,000
Total Austria-Hungary.....	7,758,000	7,910,000		155,971,000	170,420,000	164,574,000
Belgium.....	648,000	(²)	(²)	24,360,000	21,342,000	21,385,000
Bulgaria.....	545,000	(²)	(²)	8,992,000	10,000,000	9,000,000
Denmark.....	³ 682,000	(²)	(²)	19,286,000	18,473,000	18,736,000
Finland.....	(²)	(²)	(²)	10,153,000	12,344,000	12,104,000
France.....	2,902,000	2,969,000	2,958,000	45,894,000	48,890,000	52,677,000
Germany.....	15,161,000	15,489,000	15,849,000	427,776,000	456,600,000	481,169,000
Italy.....	302,000	305,000	307,000	5,297,000	5,285,000	5,589,000
Netherlands.....	557,000	564,000	562,000	16,110,000	16,094,000	15,265,000
Norway.....	³ 37,000	(²)	(²)	948,000	1,042,000	973,000
Roumania.....	326,000	265,000	224,000	4,989,000	3,583,000	3,711,000
Russia:						
Russia proper.....	65,058,000			642,173,000		
Poland.....	5,258,000			95,453,000		
Northern Caucasias.....	520,000			4,739,000		
Total Russia (European).....	70,836,000	472,933,000	474,990,000	742,365,000	1,011,029,000	1,002,468,000

¹ Less than 500 acres.

² No official statistics.

³ Area in 1907 (census).

⁴ Includes Asiatic Russia.

TABLE 12.—*Rye crop of countries named, 1911-1913—Continued.*

Country.	Area.			Production.		
	1911	1912	1913	1911	1912	1913
EUROPE—continued.						
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
Servia.....	123,000	123,000	(¹)	1,711,000	1,748,000	1,378,000
Spain.....	1,987,000	1,944,000	1,917,000	28,897,000	18,867,000	27,916,000
Sweden.....	989,000	(¹)	(¹)	23,825,000	23,323,000	22,000,000
United Kingdom.....	55,000	62,000	58,000	1,750,000	1,500,000	1,750,000
Total.....				1,518,324,000	1,820,540,000	1,840,695,000
ASIA.						
Russia:						
Central Asia.....	241,000			587,000		
Siberia.....	2,113,000			19,086,000		
Transcaucasia.....	1,000			13,000		
Total Russia (Asiatic)	2,355,000	(²)	(²)	19,686,000	32,953,000	(²)
AUSTRALASIA.						
Australia:						
Queensland.....			(³)	2,000		2,000
New South Wales.....	4,000	2,000	(⁴)	59,000	26,000	50,000
Victoria.....	3,000	1,000	(⁴)	34,000	10,000	25,000
South Australia.....	1,000	1,000	1,000	8,000	7,000	10,000
Western Australia.....	1,000		(⁴)	6,000	3,000	8,000
Tasmania.....	1,000	2,000	(⁴)	24,000	13,000	15,000
Total Australia.....	10,000	6,000		133,000	59,000	110,000
New Zealand.....	4,000	6,000	(⁴)	109,000	90,000	90,000
Total Australasia.....	14,000	12,000		242,000	149,000	200,000
Grand total.....				1,573,933,000	1,891,804,000	1,884,646,000

¹ No official statistics.² Included under European Russia.³ Less than 500 acres.⁴ No official statistics of area.TABLE 13.—*Total production of rye in countries named in Table 12, 1895-1913.*

Year.	Production.	Year.	Production.	Year.	Production.	Year.	Production.
	<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>
1895.....	1,468,212,000	1900.....	1,557,634,000	1905.....	1,495,751,000	1910.....	1,673,473,000
1896.....	1,499,250,000	1901.....	1,416,022,000	1906.....	1,433,395,000	1911.....	1,573,933,000
1897.....	1,300,645,000	1902.....	1,647,845,000	1907.....	1,538,778,000	1912.....	1,891,804,000
1898.....	1,461,171,000	1903.....	1,659,961,000	1908.....	1,590,057,000	1913.....	1,884,646,000
1899.....	1,583,179,000	1904.....	1,742,112,000	1909.....	1,747,123,000		

THE WORLD POTATO CROP.

Table 14 gives as nearly as possible the area under potatoes throughout the world in 1910, 1911, and 1912, and the world's production for the same years. The areas and production for 1913 are available for a few countries, but their total would not be comparable to the totals of the preceding years. The most striking fact exhibited in the table is the immense preponderance of Germany in the production of this crop. Out of a total of 5,945,846,000 bushels, the world's crop of 1912, Germany produced 1,844,863,000 bushels, or 31 per cent. It is remarkable that the immense Russian Empire, with 8,291,429 square miles, produced only about three-fourths the quantity of potatoes that Germany produced on her 208,780 square

miles, while the United States, with 3,026,789 square miles, produced not quite one-fourth the German crop, although the area under potatoes in the United States was nearly half the potato area of Germany, and the Russian potato area exceeded that of Germany by nearly 3,000,000 acres. The explanation is to be found in the fact that only 28 per cent of the German potato crop is used for human consumption, while the rest is used in the arts and for stock food. For the last-named purpose nearly 42 per cent is used, showing that Germany, with a very limited area of pasture land, has to depend largely on garnered produce to feed her live stock. The steady increase of the German potato crop, with a practically stationary acreage, shows the possibilities of intensive cultivation.

By comparing the production of 1911 with that of 1912, for the principal countries, it is seen that the former was a lean year, the latter a fat year, representing an advance not only over 1911 but in most cases over earlier years, the German production of 1912 being the highest on record. The United Kingdom is an exception, its production in 1912 having been the lowest since 1908.

TABLE 14.—*Acreage and production of potatoes, 1910–1912.*

Country.	Area.			Production.		
	1910	1911	1912	1910	1911	1912
NORTH AMERICA.						
United States (contiguous).....	<i>Acres.</i> 3,720,000	<i>Acres.</i> 3,619,000	<i>Acres.</i> 3,711,000	<i>Bushels.</i> 349,032,000	<i>Bushels.</i> 292,737,000	<i>Bushels.</i> 420,647,000
Canada:						
Prince Edward Island..	31,000	31,000	33,000	4,203,000	5,581,000	6,741,000
Nova Scotia.....	31,000	31,000	32,000	3,582,000	5,641,000	9,447,000
New Brunswick.....	40,000	41,000	43,000	5,228,000	8,826,000	7,558,000
Quebec.....	125,000	124,000	116,000	15,548,000	15,763,000	15,945,000
Ontario.....	158,000	157,000	158,000	17,295,000	16,043,000	22,690,000
Manitoba.....	26,000	26,000	27,000	2,866,000	5,490,000	6,182,000
Saskatchewan.....	24,000	30,000	31,000	2,917,000	5,510,000	6,552,000
Alberta.....	20,000	24,000	27,000	2,340,000	4,606,000	5,775,000
British Columbia.....	11,000	15,000	17,000	1,631,000	3,778,000	3,995,000
Total Canada.....	466,000	479,000	484,000	55,610,000	71,238,000	84,885,000
Mexico.....	(1)	(1)	(1)	924,000	924,000	924,000
Newfoundland.....	(1)	(1)	(1)	1,542,000	1,533,000	1,524,000
Total.....				407,108,000	366,432,000	507,980,000
SOUTH AMERICA.						
Argentina.....	127,000	267,000	(1)	44,564,000	18,923,000	50,000,000
Chile.....	53,000	68,000	66,000	7,862,000	7,440,000	9,656,000
Total.....				52,426,000	26,363,000	59,656,000
EUROPE.						
Austria-Hungary:						
Austria.....	3,069,000	3,108,000	3,092,000	491,126,000	426,406,000	460,821,000
Hungary proper.....	1,508,000	2,666,000	2,659,000	176,974,000	163,067,000	199,017,000
Croatia-Slavonia.....	193,000	190,000	240,000	28,490,000	23,138,000	22,997,000
Bosnia-Herzegovina.....	97,000	49,000	62,000	5,048,000	2,329,000	3,472,000
Total Austria-Hungary.....	4,867,000	6,013,000	6,053,000	701,638,000	614,940,000	686,307,000
Belgium.....	(1)	387,000	(1)	104,719,000	100,934,000	100,000,000
Bulgaria.....	7,000	8,000	(1)	432,000	511,000	500,000
Denmark.....	134,000	134,000	151,000	30,517,000	29,523,000	28,883,000
Finland.....	(1)	(1)	(1)	17,386,000	22,691,000	23,488,000

¹ No official statistics.

TABLE 14.—*Acreage and production of potatoes, 1910-1912*—Continued.

Country.	Area.			Production.		
	1910	1911	1912	1910	1911	1912
EUROPE—continued.						
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
France.....	3,823,000	3,853,000	3,863,000	313,189,000	469,386,000	552,074,000
Germany.....	8,145,000	8,207,000	8,257,000	1,597,174,000	1,263,024,000	1,844,863,000
Greece.....	(1)	(1)	(1)	331,000	331,000	551,000
Italy.....	702,000	712,000	712,000	56,563,000	62,141,000	56,313,000
Luxembourg.....	36,000	36,000	37,000	5,085,000	4,662,000	8,683,000
Malta.....	4,000	4,000	(1)	654,000	834,000	2,834,000
Netherlands.....	401,000	411,000	426,000	88,377,000	103,468,000	121,878,000
Norway.....	102,000	102,000	102,000	22,398,000	22,017,000	29,825,000
Roumania:						
Potatoes alone.....	25,000	30,000	30,000	3,847,000	4,240,000	3,748,000
Potatoes among corn.....	50,000	61,000	60,000	999,000	1,429,000	1,084,000
Total Roumania.....				4,846,000	5,669,000	4,832,000
Russia:						
Russia proper.....	8,059,000	8,166,000	(1)	898,152,000	851,120,000	925,775,000
Poland.....	2,586,000	2,606,000	(1)	400,234,000	278,309,000	411,281,000
Northern Caucasias.....	202,000	203,000	(1)	15,637,000	13,670,000	19,768,000
Total Russia (European).....	10,847,000	10,975,000		1,314,023,000	1,143,099,000	1,356,824,000
Servia.....	28,000	31,000	(1)	3,110,000	2,154,000	2,154,000
Spain.....	798,000	(1)	632,000	91,014,000	92,000,000	93,089,000
Sweden.....	377,000	378,000	(1)	66,855,000	58,391,000	65,765,000
Switzerland.....	(1)	(1)	(1)	46,712,000	2,46,712,000	2,46,712,000
United Kingdom:						
England.....	377,000	403,000	437,000	92,108,000	99,858,000	78,961,000
Scotland.....	137,000	143,000	150,000	32,790,000	36,407,000	35,041,000
Wales.....	26,000	27,000	26,000	4,915,000	6,547,000	4,704,000
Ireland.....	593,000	591,000	595,000	107,178,000	137,941,000	95,077,000
Total United Kingdom.....	1,133,000	1,164,000	1,208,000	236,991,000	280,753,000	213,783,000
Total.....				4,702,014,000	4,323,270,000	5,237,364,000
ASIA.						
Jápan.....	168,000	169,000	(1)	24,718,000	25,168,000	60,210,000
Russian Asiatic.....	404,000	423,000	(1)	20,246,000	32,956,000	58,564,000
Total.....				53,964,000	58,124,000	118,774,000
AFRICA.						
Algeria.....	43,000	45,000		1,687,000	1,606,000	1,606,000
Union of South Africa:						
Cape of Good Hope.....	(1)	(1)	(1)	1,283,000	1,283,000	1,283,000
Natal.....	(1)	(1)	(1)	627,000	627,000	627,000
Transvaal.....	(1)	(1)	(1)	1,272,000	1,272,000	1,272,000
Orange Free State.....	(1)	(1)	(1)	618,000	618,000	618,000
Total Union of South Africa.....				3,800,000	3,800,000	3,800,000
Total.....				5,487,000	5,406,000	5,406,000
AUSTRALASIA.						
Australia:						
Queensland.....	8,000	8,000	8,000	506,000	584,000	489,000
New South Wales.....	36,000	44,000	43,000	3,739,000	4,519,000	2,806,000
Victoria.....	62,000	63,000	48,000	6,532,000	6,097,000	4,446,000
South Australia.....	8,000	8,000	7,000	693,000	893,000	846,000
Western Australia.....	2,000	2,000	3,000	222,000	219,000	348,000
Tasmania.....	21,000	26,000	22,000	2,758,000	2,617,000	2,321,000
Total Australia.....	137,000	151,000	131,000	14,450,000	14,929,000	11,256,000
New Zealand.....	31,000	29,000	28,000	6,739,000	5,283,000	5,410,000
Total Australasia.....	168,000	180,000	159,000	21,189,000	20,212,000	16,666,000
Grand total.....				5,242,188,000	4,799,807,000	5,945,846,000

¹ No official statistics.² Data for 1911.³ Census figures for 1911.

THE WORLD FLAX CROP.

Previous to the invention of the cotton gin, the flax plant was the chief source of raw material for the textile industries and for the spinning and weaving handicrafts that were an essential feature of every household. Excepting in Europe, its culture for fiber during the subsequent century practically ceased, and an extensive industry—confined almost exclusively to certain parts of the United States, Canada, Argentina, and British India—has been developed in the cultivation of the plant for its seed, the straw with a few unimportant exceptions being treated as a cumbersome waste. The seed is utilized almost entirely for the extraction of linseed oil, valuable because of its exceptional drying properties, in the manufacture of paint, linoleum, patent leather, printer's ink, and soap; the residue, linseed oilcake, because of its high nitrogenous content, is one of the most valuable of cattle feeds.

Modern flax culture therefore serves two important purposes; of the 19 million acres which approximately represent the total area sown in the world, upward of 5 million acres (of which $3\frac{1}{2}$ million acres are in Russia) are devoted primarily to the production of fiber; the remaining 14 million acres are cultivated almost exclusively for the seed.

Cultivation differs somewhat according to the purpose for which the product is designed. In fiber production the sowing of from 2 to 3 bushels of seed per acre, and the careful pulling and handling of the straw by hand, has for its chief object long straight and silky fiber; the yield of seed, partly because the plant is usually cut a little before maturity, is generally small. The seed, however, constitutes a product of valuable secondary importance, especially in Russia, where the enormous acreage, even with a small yield per acre, gives the country rank as one of the largest producers. In other fiber-producing countries the saving of the seed is of minor importance and in Ireland it is neglected altogether.

In the culture of flax for seed, on the other hand, the common custom is to sow only from 2 to 3 pecks per acre. The result is a short straw and a coarse fiber, and the effect of the subsequent thrashing of the seed by machinery is to destroy whatever value the straw may have had for textile purposes. In no country where flax is grown exclusively for the seed does the straw to any great extent serve manufacturing uses; probably the most successful example is the manufacture in a small way of binder twine, though many efforts have been made to use it for paper stock and some other purposes. In this connection it may be of interest to note that, after the close of the Civil War, when flax growing for seed in the United States was largely concentrated in southern Ohio, quite an extensive industry sprang up there in the manufacture of cotton bagging from the

coarse fiber obtained from the straw, an otherwise valueless product. The removal of the customs duty on the competing product, jute, together with other causes, soon annihilated the industry. Flaxseed cultivation in its migratory movement northwestward to its present center in the Dakotas and western Canada has since increased in mammoth proportions, but the industry of utilizing the fiber in the manufacture of cotton bagging has never been resumed.

Of the four countries which produce flax for the seed alone, Argentina in the winter of 1913-14 produced, according to the preliminary estimate of the Argentine Department of Agriculture, 38,974,000 bushels from 2,614,000 acres. Canada's crop in the fall of 1913 was 17,539,000 bushels from 1,552,800 acres; the 1913 crop of the United States was 17,583,000 bushels from 2,291,000 acres, and that harvested in British India in the spring of 1913 was 21,428,000 bushels. The total 1913 product of the four countries which, excepting the crop of Russia, constitutes the commercial crop of the world, was almost 96 million bushels, as compared with 102 million bushels in the previous year. Table 15 is a detailed statement of the area and production of flaxseed and flax fiber for the years 1912, 1911, and 1910 for all countries for which figures are available.

TABLE 15.—*Flax crop of countries named, 1910-1912.*

Country.	Area.			Production.					
	1910	1911	1912	Seed.			Fiber.		
				1910	1911	1912	1910	1911	1912
NORTH AMERICA.	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
United States.....	2,467,000	2,757,000	2,851,000	12,718,000	19,370,000	28,073,000			
Canada:									
Quebec.....	1,000	1,000	1,000	13,000	13,000	9,000			
Ontario.....	9,000	9,000	9,000	83,000	124,000	143,000			
Manitoba.....	35,000	80,000	100,000	177,000	1,152,000	1,252,000			
Saskatchewan.....	506,000	682,000	1,780,000	3,893,000	7,672,000	23,033,000			
Alberta.....	31,000	107,000	132,000	78,000	1,114,000	1,693,000			
Total Canada.....	582,000	879,000	2,022,000	4,244,000	10,075,000	26,130,000			
Mexico.....	(1)	(1)	(1)	150,000	150,000	150,000			
Total.....				17,112,000	29,595,000	54,353,000			
SOUTH AMERICA.									
Argentina.....	3,596,000	3,716,000	4,028,000	28,212,000	23,424,000	22,518,000			
Uruguay.....	(1)	95,000	143,000	600,000	660,000	1,057,000			
Total.....				28,812,000	24,084,000	23,575,000			
EUROPE.									
Austria-Hungary:									
Austria.....	96,000	95,000	91,000	663,000	697,000	650,000	50,191,000	46,646,000	51,532,000
Hungary proper.....	21,000	21,000	(1)	164,000	174,000	174,000	18,492,000	13,932,000	(1)
Croatia-Slavonia.....	18,000	17,000	(1)	21,000	15,000	15,000	8,143,000	6,448,000	(1)
Bosnia-Herzegovina.....	(1)	(1)	(1)	4,000	4,000	4,000	1,000,000	1,000,000	1,000,000
Total Austria-Hungary.....				852,000	890,000	843,000	77,826,000	68,026,000	
Belgium.....	(1)	49,000	(1)	300,000	300,000	300,000	28,000,000	28,000,000	28,000,000
Bulgaria.....	1,000	1,000	(1)	8,000	10,000	10,000	709,000	877,000	800,000
France.....	54,000	59,000	69,000	416,000	496,000	576,000	33,106,000	45,004,000	46,074,000
Italy.....	22,000	22,000	22,000	232,000	341,000	343,000	6,883,000	6,078,000	5,511,000
Netherlands.....	29,000	39,000	36,000	316,000	579,000	428,000	14,189,000	20,929,000	21,217,000
Roumania.....	33,000	52,000	79,000	363,000	603,000	772,000	4,448,000	4,000,000	8,954,000

Russia:									(1)
Russia proper.....	3,048,000	3,237,000	(1)	16,743,000	18,877,000				(1)
Poland.....	88,000	95,000	(1)	816,000	935,000				(1)
Northern Caucasia.....	80,000	96,000	(1)	590,000	732,000				(1)
Total Russia (European).....	3,216,000	3,428,000		18,149,000	20,544,000	18,000,000	2 702,477,000	2 1,034,000,000	
Servia.....	4,000	4,000	(1)				2,192,000	2,091,000	(1)
Sweden.....	(1)	4,000	5,000	20,000	17,000	17,000	1,400,000	1,500,000	(1)
Ireland.....	46,000	67,000	55,000				19,882,000	25,179,000	29,125,000
Total.....				20,656,000	23,780,000	21,289,000	891,112,000	1,235,607,000	
ASIA.									
British India.....	3,188,000	3,757,000	5,052,000	17,112,000	22,544,000	25,680,000			
Russia:							(1)	(1)	(1)
Central Asia.....	90,000	125,000	(1)	429,000	220,000		(1)	(1)	(1)
Siberia.....	137,000	154,000	(1)	832,000	785,000		(1)	(1)	(1)
Transcaucasia.....	20,000	19,000	(1)	96,000	94,000		(1)	(1)	(1)
Total Russia (Asiatic).....	247,000	298,000		1,357,000	1,099,000	1,350,000			
Total.....				18,469,000	23,643,000	27,030,000		49,000,000	
AFRICA.									
Algeria.....	1,000	2,000	1,000	4,000	16,000	13,000	(1)	(1)	(1)
Grand total.....				85,053,000	101,118,000	126,260,000	891,112,000	1,284,607,000	

¹ No official statistics.² Includes 27 governments only.

TABLE 16.—*Total production of flax (seed and fiber) in countries named in Table 15, 1896-1912.*

Year.	Production.		Year.	Production.	
	Seed.	Fiber.		Seed.	Fiber.
	<i>Bushels.</i>	<i>Pounds.</i>		<i>Bushels.</i>	<i>Pounds.</i>
1896.....	82,684,000	1,714,205,000	1905.....	100,458,000	1,494,229,000
1897.....	57,596,000	1,498,054,000	1906.....	88,165,000	1,871,723,000
1898.....	72,938,000	1,780,693,000	1907.....	102,960,000	2,042,390,000
1899.....	66,347,000	1,138,763,000	1908.....	100,850,000	1,907,591,000
1900.....	62,431,000	1,315,931,000	1909.....	100,820,000	1,384,524,000
1901.....	72,314,000	1,050,260,000	1910.....	85,053,000	891,112,000
1902.....	83,891,000	1,564,840,000	1911.....	101,118,000	1,284,607,000
1903.....	110,455,000	1,492,383,000	1912.....	126,260,000	.....
1904.....	107,743,000	1,517,922,000			

ARGENTINE BEEF.

By GEORGE K. HOLMES.

MOST PROMINENT NEW SUPPLY.

Chilled and frozen beef is coming from Argentina at a rate of 9,000,000 pounds monthly, and the importations are exciting conjectures concerning their importance in the supply of dressed beef for consumption in the United States. In October last this country received from Argentina 2,069,794 pounds of chilled and frozen beef; in November, 3,988,898 pounds; in December, 9,440,488 pounds; in January, 8,935,797 pounds; or, in the four months, a total of 24,434,977 pounds.

Argentina, however, contributed 58 per cent to the total imports of chilled and frozen beef during the four months, the remainder coming from Australia, New Zealand, Uruguay, Canada, and Mexico. Argentina is far in the lead as a source of imports of dressed beef into this country, and has future possibilities of enormous increase, and therefore an examination of the factors of the situation is timely.

RISE OF THE ARGENTINE EXPORT TRADE.

Many years ago Argentina established an export trade in salted beef, at a time before fresh beef was preserved by freezing or chilling, and years ago also live cattle were exported, chiefly to England. In the course of time Argentine cattle became infected with the foot and mouth disease, and the British Government, to protect home cattle, prohibited the importation of live cattle from Argentina.

Argentina, however, had become too important a source of fresh beef to the United Kingdom to be lost, and consequently British and other companies established slaughtering and freezing works in Argentina and exported the frozen beef, mostly to England.

A revolutionary element was introduced into the Argentine exportation of frozen beef by the diminishing per capita supply of beef in the United States, which rapidly led to the extinction of the export trade of this country in refrigerated beef. This beef had mostly

gone to the United Kingdom. Four of the great slaughtering companies of Chicago and other cities bought or built slaughtering and chilling or freezing establishments in Argentina and speedily dominated the business of slaughtering beef animals there for export.

In 1911 the seven freezing companies then operating in Argentina made a combine limiting in a certain degree the exportation of chilled and frozen beef. In April, 1913, one of these companies, which in the meantime had passed into the control of a Chicago company, expressed a desire to increase its shipments because of the increased capacity of its works, but this proposition was not agreed to by the other companies and the agreement of 1911 was not renewed. Of the seven companies, two were Argentine, three English, and two, although registered as Argentine companies, belonged to Chicago companies.

At the present time there are nine establishments for slaughtering, chilling or freezing, and exporting beef, located in or near Buenos Aires, and five of these companies are owned or operated by Chicago slaughtering and packing houses. These five do by far the major portion of the entire business.

NUMBER OF CATTLE IN ARGENTINA.

In a census taken in Argentina in 1888 it was ascertained that there were 21,961,657 cattle in that country, and that of these cattle 17,574,572 were natives, 3,388,801 were grades, and only 37,858 were purebreds and crossbreds. Not included in the foregoing classes were 960,426 milch cows and work oxen.

By the time of the national census of 1895 the number of cattle in Argentina had slightly declined, and the total was 21,701,526. The native cattle had absolutely and relatively declined very considerably and the grades and purebreds had increased correspondingly.

In 1908 there was a live-stock census which ascertained that the number of cattle in Argentina was 29,116,625; this number was larger than for any year either subsequently or before. The improvement in the beef qualities of the cattle continued, and the census found 10,785,280 natives, or only about one-third of the total number of the cattle; it found 14,027,207 grades, or nearly one-half of the total number of cattle; and it found also 918,749 pure breeds and crossbreds.

The improvement of Argentine beef cattle has been speedily and intelligently performed. Argentine cattle owners have been the readiest and best buyers of the British pure-bred beef cattle, and have bought them in large numbers. So rapidly have the Argentine cattle herds been improved in beef qualities in recent years that they are now producing export beef that is not excelled by that of any other country at present exporting in large quantities.

In consequence of drought, the estimated number of cattle in Argentina, December 31, 1909, was 27,824,509, a reduction of 1,300,000 cattle from the number of 1908. There was some recovery in 1910, for which year the estimate was 28,827,900, and the cattle hardly maintained their numbers in 1911, for which year the estimate was 28,786,168. The last estimate received in this country is that of December 31, 1912, which gave to Argentina 29,016,000 cattle, a number slightly under that of the census of May 30, 1908. The figures may be found in Table 17, and an analysis of the cattle of 1908, as determined by the census, with distinction of breed, sex, and age, by groups, may be found in Table 18.

TABLE 17.—*Number of cattle in Argentina, 1888-1912.*

Classes.	1888. (Census.) ¹	1895. (Census, May 10.) ²	1908. (Census, May 30.) ³	1909. (Estimate, Dec. 31.) ⁴	1910. (Estimate, Dec. 31.) ⁴	1911. (Estimate, Dec. 31.) ⁵	1912. (Estimate, Dec. 31.) ⁶
Cattle:							
Natives.....	17,574,572	14,197,159	10,785,280	.....	.....	.....	.....
Grades.....	3,388,801	4,678,348	14,027,207	.....	.....	.....	.....
Purebreds and cross- breds.....	37,858	72,216	918,749	.....	.....	.....	.....
Milch cows.....	960,426	1,800,799	2,163,900	.....	.....	.....	.....
Work oxen.....		953,004	1,221,489	.....	.....	.....	.....
Total.....	21,961,657	21,701,526	29,116,625	27,824,509	28,827,900	28,786,168	29,016,000

¹ The Animal Industry of Argentina, by Frank W. Bicknell, Bureau of Animal Industry, U. S. Department of Agriculture, Bul. 48, p. 57.

² Segundo Censo de la Republica Argentina, 1895, vol. 3, pp. 200, 204.

³ Agricultural and Pastoral Census of the Nation, 1908. Stock-breeding, vol. I, pp. 202, 310.

⁴ La Argentina Agrícola, 1911-1912, p. 105.

⁵ Boletín Mensual de Estadística Agrícola, December, 1912, p. 14.

⁶ Boletín Mensual de Estadística Agrícola, May, 1913, p. 6.

TABLE 18.—*Number of cattle in Argentina distinguished by breed, sex, and age groups, census of May 30, 1908.*

Classes.	Total.	Calves, male.	Calves, female.	Bulls.	Steers.	Cows for breeding.	Milch cows.	Work oxen.
Natives.....	13,071,282	1,668,165	1,510,930	517,562	1,533,655	5,554,968	1,236,621	1,049,381
Grades.....	15,060,446	2,009,691	1,881,339	276,052	3,027,143	6,832,982	866,579	166,660
Purebreds.....	112,786	13,241	12,434	15,424	15,189	50,132	5,504	862
Crossbreds.....	872,111	129,346	106,709	77,412	111,040	387,822	55,196	4,586
Total.....	29,116,625	3,820,443	3,511,412	880,450	4,687,027	12,825,904	2,163,900	1,221,489

CONDITION OF THE CATTLE-PRODUCING INDUSTRY.

The conditions under which beef cattle are kept and the essential facts relating to the beef-animal producing industry have been under observation by three noted experts of this country, one of them as special agent of the Tariff Board in 1911. The Argentine beef, both for home consumption and for export, is not corn fed. Part of it is the product of native pastures, but the best of it is fed on alfalfa. In the Province of Buenos Aires, reports the special agent of the Tariff Board, "the land is worth too much money on the market to be profitable with cattle or sheep grazing. The summer droughts

make it hard to grow cultivated grasses. Alfalfa is a success in every part of the country." "Agriculture is coming in rapidly and lands are constantly being subdivided into farms. Never, so far as was noted, do the farmers keep live stock on their farms more than the animals needed for work, or perhaps some cows for dairy use, or a few sheep bought for food to be killed off one at a time as needed." One-third of the cattle of the Republic are in this Province.

Ranchmen very often lease lands to the farmers or colonists, usually for wheat growing. This withdraws the land from stock growing for three to five years, when it is sown to alfalfa and returned to stock again, while the colonist moves on to develop another piece of land from wildness to wheat and to leave it later in turn to alfalfa.

"The Province of Entre Rios," says the special agent, "is fully occupied and fully stocked with sheep and cattle. It is a land where perennial grasses are not much seen, and those found are of hard, coarse kinds, of little use. The nutritious grasses are mostly annuals, and annual clovers abound. The Province is going rapidly to agriculture."

Concerning the Province of Corrientes, the special agent writes that "it is a great cattle country, but many of the herds are of the unimproved native stocks, with wide horns and huge bony frames. They go to the salting works at about five or six years of age. Good cattle thrive in southern Corrientes and some day doubtless will over all of the Province."

"There is no probability of much immediate development of the live-stock industry" in the Province of Chaco. In the Province of Santa Fe "the number of cattle, now 2,639,480, will increase, no doubt, owing to the laying down of lands to alfalfa." "In Pampa Central the 5,000,000 sheep are decreasing, due to the coming in of agriculture. Cattle, on the other hand, are likely to increase, as it is a great alfalfa-growing region."

In summing up the results of his observations in Argentina, the special agent of the Tariff Board states that in his opinion "there is no doubt that sheep breeding in Argentina has passed its meridian and is now on the decline. This is because of the large immigration to Argentina and the continually laying down of lands to agriculture." "Contrasting cattle breeding with sheep breeding, the production of good cattle on alfalfa will no doubt increase in Argentina as time goes on, especially if prices for beef remain good. It is probably the most marvelous place for cattle breeding in the world. This is especially true of the regions where alfalfa is grown. In Argentina cattle seem to bloat very little on alfalfa pasture. They run in thousands on the alfalfa pastures, which are perennial, and in winter eat alfalfa hay from ricks piled up for them, without men taking the trouble, as a rule, to take it out for them."

It is important to remember, however, that the great defect in Argentina is the weather, which is most uncertain. Rains may come at any time of the year or they may not come at all. Sometimes a region will be without much, if any, rain for one, two, or three years. The rainfall in normal years is just sufficient for the grasses and crops. In exceedingly rare seasons it is excessive. Perhaps in half the years it is too light. One year in seven, more or less, it is withheld. In 1830 nearly all the cattle, horses, and sheep of Argentina perished for want of water, "but no doubt the losses were much more severe than they could be to-day, for wells and windmills abound on every hand."

SLAUGHTER OF COWS, STEERS, AND CALVES.

Estimates of the slaughter of cows, steers, and calves in Argentina have been compiled from trustworthy sources, with results that may be found in Table 19. There are three classes of slaughtering establishments, namely, the chilling and freezing establishments of the exporters, the salting establishments, and the public slaughterhouses, which slaughter for domestic consumption. Although the total number of cattle in the Republic declined after 1908, and had not recovered the decrease by the end of 1912, it will be observed in this table that the cows slaughtered in the public slaughterhouses increased from 382,114 in 1908 to 948,088 in 1912; that the slaughtered steers increased from 445,487 in 1908 to 665,296 in 1912; and that the slaughtered calves increased from 194,774 in 1908 to 316,878 in 1911, the number for 1912 not being obtainable.

In the salting establishments also the slaughter of cows and steers increased in large degree from 1908 to 1912. There is little or no calf slaughtering in these establishments. As might be expected, the increase of slaughter in the chilling and freezing establishments has been enormous. For cows, the increase was from 16,452 in 1908 to 122,929 in 1912; for steers, the increase was from 709,498 in 1908 to 1,245,091 in 1912; and for calves, the increase was from 7,835 in 1908 to 18,626 in 1912.

Upon consolidating the slaughter of the three classes of establishments it appears that the slaughtered cows increased from 426,321 in 1908 to 1,155,985 in 1912, or 171 per cent; the slaughtered steers increased from 1,375,406 in 1908 to 2,225,497 in 1912, or 62 per cent; and the slaughtered calves increased from 202,609 in 1908 to 340,158 in 1911, or 68 per cent.

To show how the increased slaughter has counted against the restoration of the number of cattle of 1908, the percentage of increase of slaughter in the two years 1911 and 1912 over that of the two years 1909 and 1910, when the number of cattle was considerably diminished below the number of 1908 on account of drought, has been computed. The slaughter of cows increased 79 per cent, of steers 36 per cent, and of calves (to 1911 only) 29 per cent.

Very evidently, future increase in the supply of beef from Argentina must depend on a slaughter that is below the natural increase of the herds. The report of the slaughter for 1913 has not been received, but it is a matter of general knowledge in Argentina that cow slaughter was overdone during the year; and, if so, this over-slaughter of breeding stock has postponed to that extent an increase of beef production out of the natural increase of the herds.

TABLE 19.—*Number of cattle slaughtered in Argentina in chilling and freezing, salting, and public slaughterhouses, 1904–1912.*

[1904–1911 from *La Argentina Agrícola*, 1911–1912; 1912 from *Memoria presentada al Congreso de la Nación por el Ministro de Agricultura*, Dr. Adolf Múgica, 1912.]

Year.	Total.			Chilling and freezing establishments.		
	Cows.	Steers.	Calves.	Cows.	Steers.	Calves.
1904.....	359,367	988,811	108,454	1,476	306,352	.....
1905.....	283,437	1,290,767	106,697	2,527	517,036	.....
1906.....	305,279	1,280,309	119,960	954	563,517	.....
1907.....	(1)	(1)	(1)	(1)	(1)	(1)
1908.....	426,321	1,375,406	202,609	16,452	709,498	7,835
1909.....	564,023	1,487,507	224,622	39,935	758,782	9,989
1910.....	799,680	1,584,495	301,095	108,338	852,150	12,917
1911.....	1,278,328	1,952,053	340,158	150,245	1,094,906	23,280
1912.....	1,155,985	2,225,497	(2)	122,929	1,245,091	18,626

Year.	Salting establishments.			Public slaughterhouses.		
	Cows.	Steers.	Calves.	Cows.	Steers.	Calves.
1904.....	22,781	212,959	.....	335,110	469,500	108,454
1905.....	28,329	304,930	.....	252,581	468,801	106,697
1906.....	39,975	245,103	.....	264,350	471,689	119,960
1907.....	(1)	(1)	(1)	382,414	452,780	151,955
1908.....	27,755	220,421	.....	382,114	445,487	194,774
1909.....	53,515	287,981	.....	470,573	440,744	214,633
1910.....	114,381	318,757	2,118	576,961	413,588	286,060
1911.....	86,871	300,741	.....	1,041,212	556,406	316,878
1912.....	84,968	315,110	.....	948,088	665,296	(1)

¹ Number omitted from sources of information.

² Data incomplete.

EXPORTS OF MEAT ANIMALS AND PACKING-HOUSE PRODUCTS.

A full statement of the exports of meat animals and packing-house products from Argentina has been compiled for each year from 1895 to 1912, with results that may be found in Table 20. The exports of chilled beef did not begin until 1908, when 13,783,159 pounds were exported. The amount increased to 55,624,263 pounds in 1912, and to a much higher quantity in 1913. Argentine chilled beef is rapidly displacing Argentine frozen beef in the British market, a change promoted by the Chicago interests that have become predominant in the Argentine chilling and freezing establishments.

The frozen beef exported from Argentina in 1895 weighed 3,498,870 pounds, in 1908 it weighed 384,841,590 pounds, and in 1912 it weighed 700,225,052 pounds.

The exports of chilled and frozen beef increased 90 per cent from 1908 to 1912.

The exported live cattle numbered 408,126 in 1895, and has not since been equaled in any one year. The number fell to as low a figure as 60,916 in 1908, and the largest number since 1905 was reached in 1912, when it was 261,416. Prohibition of imports into the United Kingdom, on account of foot-and-mouth disease in Argentina, account for the great decline in exports of cattle.

The jerked-beef trade was at one time very large and the exports amounted to 121,450,000 pounds in 1895. In 1912 the exports of this beef had dwindled to 19,453,390 pounds.

The frozen-mutton trade reached its height in 1904, when 195,365,000 pounds were exported. Fluctuations mark the exports of subsequent years, and in 1912 the exports were 154,707,805 pounds.

Argentina's exports of live meat animals and of packing-house products may be consolidated into a total if expressed in value. For 1895 the combined values amounted to \$18,746,218; in 1908 the amount was \$37,912,228; and in 1912 it was \$67,252,319.

A study of Table 20 discovers that foreign inducements to increase the exports of chilled and frozen beef have met with large responses from Argentina, so large indeed in the most recent years that this trade is retarding the natural increase of herds, if not almost preventing it. The cause of retardation next back of this is the cessation of the exports of chilled beef from the United States, which has thrown upon Argentina the principal portion of the task of continuing the export supply to the United Kingdom and other countries.

The imports of dressed beef from Argentina into the United Kingdom are increasing, yet they were a diminishing fraction of the total during the past three years. They were 83 per cent of the total in 1911, 82 per cent in 1912, and 78 per cent in 1913.

TABLE 20.—*Exports of meat animals and packing-house products from Argentina, 1895–1912.*

Year.	Total value, all articles named.	Live meat animals.						
		Total value.	Cattle.		Sheep. ¹		Swine.	
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Number.</i>	<i>Dollars.</i>	<i>Number.</i>	<i>Dollars.</i>	<i>Number.</i>	<i>Dollars.</i>
1895.....	18,746,218	8,064,703	408,126	6,758,117	429,949	1,247,103	5,572	59,483
1896.....	17,280,712	7,800,538	382,539	6,314,526	512,061	1,482,403	374	3,609
1897.....	14,534,644	6,310,204	238,121	4,842,584	504,255	1,460,047	666	7,573
1898.....	18,019,144	9,103,268	359,296	7,421,284	577,899	1,673,487	587	8,497
1899.....	16,361,677	8,185,623	312,150	6,585,170	543,462	1,573,964	1,830	26,489
1900.....	16,702,051	4,123,855	150,550	3,549,415	198,102	573,861	40	579
1901.....	19,205,726	1,990,197	119,189	1,911,059	25,749	75,519	250	3,619
1902.....	26,412,782	3,112,473	118,303	2,748,749	122,503	355,763	532	7,961
1903.....	26,759,552	4,768,520	181,860	4,282,110	167,747	485,628	54	782
1904.....	26,051,906	2,836,269	129,275	2,752,971	28,128	82,241	73	1,057
1905.....	38,613,362	5,332,703	262,681	4,979,866	120,166	351,462	95	1,375
1906.....	29,988,482	1,922,510	71,106	1,617,480	102,916	304,321	49	709
1907.....	32,485,349	2,310,413	74,841	1,990,206	110,567	320,091	4	116
1908.....	37,912,228	2,112,362	60,916	1,811,131	103,792	300,478	26	753
1909.....	45,541,069	4,202,302	132,450	3,944,746	88,636	256,601	33	955
1910.....	53,220,701	4,137,910	89,733	3,914,474	77,180	223,436	.....	.....
1911.....	65,913,927	8,236,160	184,112	7,915,654	110,690	320,448	2	58
1912.....	67,252,319	9,124,118	261,416	8,820,177	104,898	303,680	9	261

¹ Including some goats.

TABLE 20.—Exports of meat animals and packing-house products from Argentina, 1895–1912—Continued.

Year.	Packing-house products.									
	Total.		Beef, frozen.		Beef, chilled.		Beef, jerked.		Blood, dried.	
	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	
1895...	10,681,515	3,498,870	61,260				121,450,000	4,077,529	3,086,000	67,541
1896...	9,480,174	6,606,278	115,668				101,208,000	3,104,927	2,701,000	59,115
1897...	8,224,440	9,350,000	163,706				79,891,000	2,379,992	2,370,000	51,859
1898...	8,915,876	12,935,000	226,467				49,035,000	2,042,392	1,806,000	39,520
1899...	8,176,054	20,016,000	350,431				42,249,000	1,967,069	933,000	20,427
1900...	12,578,196	54,212,000	2,372,894				36,264,000	1,910,272	797,451	17,453
1901...	17,215,529	98,996,000	4,333,281				53,563,000	2,778,674	2,209,935	48,366
1902...	23,300,309	154,363,000	6,756,769				49,172,000	2,554,789	2,039,000	44,652
1903...	21,991,032	179,721,000	7,866,638				28,640,000	1,488,047	3,027,000	66,243
1904...	23,215,637	215,489,000	9,432,252				25,851,000	1,343,213	2,557,000	55,953
1905...	33,280,659	336,988,542	14,750,694				55,749,925	3,607,598	6,981,968	152,799
1906...	28,065,972	339,087,321	14,842,566				10,251,390	575,760	7,140,699	156,285
1907...	30,174,936	304,724,221	13,338,386				23,476,785	1,136,824	7,200,224	157,565
1908...	35,799,866	384,841,590	16,845,293	13,783,159	603,300	14,661,681	745,770	9,689,217	212,055	
1909...	41,338,767	461,720,401	20,210,525	2,694,021	117,921	25,622,886	1,278,676	9,444,506	206,699	
1910...	49,082,791	540,715,628	23,668,248	18,609,029	814,588	20,816,823	996,864	10,831,200	237,069	
1911...	57,677,767	656,393,195	28,731,709	33,280,642	1,456,768	26,720,519	1,603,458	14,175,578	310,248	
1912...	58,128,201	700,225,052	30,650,287	55,624,263	2,434,812	19,453,390	1,351,722	13,333,421	291,834	

Year.	Packing-house products—Continued.									
	Bones.		Cracklings.		Hoofs.		Horns.		Intestines, salted and dried.	
	<i>Tons.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Tons.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1895.....	43,565	477,875	1,524,963	30,038	1,336,151	8,773	2,514	123,236	991,028	21,120
1896.....	20,093	183,976	1,533,491	30,205	1,154,671	7,581	1,951	95,626	966,098	20,527
1897.....	40,201	399,239	1,555,315	30,636	1,424,812	9,354	1,977	96,931	1,688,965	36,419
1898.....	34,943	445,078	1,247,695	24,576	1,772,679	11,640	1,658	81,310	2,616,271	56,761
1899.....	20,658	257,385	1,530,722	30,150	1,507,924	9,901	1,673	82,046	2,609,785	56,724
1900.....	25,030	337,068	1,704,940	37,314	1,651,738	9,038	1,440	112,980	2,955,563	64,247
1901.....	27,068	306,593	2,515,463	55,052	1,650,250	9,030	1,874	146,997	4,384,014	95,163
1902.....	34,505	329,771	2,388,380	52,270	2,409,365	13,182	2,436	191,058	5,112,615	110,640
1903.....	31,002	284,438	1,982,021	43,379	1,942,000	10,629	1,546	121,250	4,130,712	89,152
1904.....	25,036	243,418	2,385,044	52,200	2,126,137	11,633	1,896	148,668	3,673,247	105,325
1905.....	60,185,580	964,890	3,255,158	71,243	2,493,403	13,647	5,416,722	182,050	6,947,953	151,602
1906.....	51,814,714	826,200	3,227,534	70,634	1,933,434	10,580	5,103,649	169,750	7,758,146	120,809
1907.....	54,643,216	1,070,608	3,727,979	81,595	2,438,288	13,338	4,459,906	148,357	6,396,415	139,197
1908.....	57,537,855	1,356,869	4,171,103	91,278	2,372,150	12,976	4,929,486	164,000	7,202,292	156,634
1909.....	57,811,226	1,293,331	5,850,827	128,252	2,696,226	14,746	6,080,287	202,282	8,189,871	177,813
1910.....	65,011,449	1,397,946	6,382,317	139,663	2,153,894	11,781	7,064,720	234,700	10,475,931	227,778
1911.....	90,020,432	2,364,213	7,433,911	162,716	3,511,928	19,217	6,313,974	210,055	13,417,833	292,467
1912.....	59,678,522	914,275	7,220,433	158,026	3,013,238	16,487	6,272,634	208,671	15,104,804	328,018

Year.	Packing-house products—Continued.							
	Meat extract.		Meat, frozen, n. e. s.		Meat preserved.		Mutton, frozen.	
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1895.....	328,173	201,105	888,460	15,556	2,035,424	89,094	92,334,000	1,616,638
1896.....	1,076,307	659,565	1,333,963	23,257	4,504,349	197,162	99,439,000	1,741,058
1897.....	405,922	248,750	1,537,885	26,926	2,538,100	111,098	112,202,000	1,964,526
1898.....	667,474	584,329	2,140,553	37,480	3,577,963	156,614	131,909,000	2,309,590
1899.....	843,823	738,711	2,033,000	35,573	4,004,000	175,244	124,841,000	2,185,792
1900.....	253,990	222,351	2,401,000	68,319	3,097,000	135,563	124,367,000	4,355,019
1901.....	477,951	418,414	3,109,000	88,440	2,085,927	91,402	138,920,000	4,864,587
1902.....	653,335	571,952	5,556,000	158,086	3,624,487	158,650	176,531,000	6,181,601
1903.....	764,093	668,913	6,918,000	196,834	8,248,677	361,059	172,271,000	6,033,140
1904.....	456,564	399,691	9,235,000	262,777	5,355,000	234,361	195,365,000	6,841,162
1905.....	960,048	840,467	12,085,617	343,829	5,485,045	240,117	172,732,615	6,048,677
1906.....	928,293	812,667	13,575,927	386,265	2,775,591	121,501	148,563,585	5,202,368
1907.....	1,974,852	1,728,869	15,269,060	434,441	3,515,834	153,895	153,848,011	5,387,384
1908.....	1,521,121	1,331,654	25,112,599	714,506	3,808,283	166,696	173,823,892	6,086,919
1909.....	2,979,504	2,608,383	22,019,545	626,484	14,087,667	616,648	146,594,877	5,132,426
1910.....	3,358,355	2,940,046	24,475,048	696,361	26,635,688	1,165,900	165,569,869	5,797,848
1911.....	1,136,641	995,064	32,114,538	913,719	30,930,230	1,487,386	189,410,414	6,632,720
1912.....	1,349,061	1,181,025	34,526,241	982,362	39,019,215	1,707,936	154,707,805	5,417,482

TABLE 20.—*Exports of meat animals and packing-house products from Argentina, 1895-1912—Continued.*

Year.	Packing-house products—Concluded.									
	Oils, animal.		Tallow, pressed.		Tallow and fat, melted.		Tongues, preserved and salted.		All other.	
	<i>Pounds.</i>	<i>Dolls.</i>	<i>Pounds.</i>	<i>Dolls.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dolls.</i>	<i>Dollars.</i>	
1895.....	945,633	33,067	18,929	580	89,481,000	3,674,480	1,755,717	153,349	30,274	
1896.....	773,143	28,527	8,360	257	75,272,000	3,068,050	1,410,801	123,501	21,072	
1897.....	842,607	28,082	778	24	69,529,212	2,563,086	1,244,644	108,302	5,510	
1898.....	650,950	24,015	2,210	58	64,685,212	2,762,324	1,235,062	108,122	5,600	
1899.....	593,442	25,840	.....	.....	53,242,000	2,128,397	1,284,406	112,364	.....
1900.....	689,520	31,195	9,575	293	54,756,000	2,707,141	1,500,750	197,049	.....
1901.....	327,426	14,697	12,436	381	73,564,000	3,766,120	1,522,885	198,332	.....
1902.....	381,863	19,698	113,904	3,490	108,236,000	5,991,722	1,244,394	161,979	.....
1903.....	538,755	28,190	204,263	6,259	80,603,000	4,589,134	1,046,177	137,194	533	
1904.....	428,938	20,097	187,373	5,742	80,070,000	3,871,660	1,392,602	182,771	4,714	
1905.....	731,416	47,699	53,448	1,839	100,878,087	5,134,861	1,143,559	150,168	578,479	
1906.....	648,424	44,150	155,356	4,760	55,778,585	3,708,038	670,194	88,008	925,631	
1907.....	490,601	36,972	218,668	6,700	68,155,209	4,638,596	1,669,032	219,170	1,483,039	
1908.....	760,735	39,917	99,950	3,062	96,951,694	5,819,530	1,925,780	252,886	1,196,521	
1909.....	811,227	46,930	.....	.....	119,764,895	7,308,167	2,648,796	347,828	1,020,656	
1910.....	765,774	52,834	9,235	283	128,761,868	9,202,897	2,080,612	274,400	1,223,585	
1911.....	926,011	61,320	.....	.....	168,482,146	11,356,988	1,573,716	206,655	873,064	
1912.....	1,182,400	81,339	.....	.....	166,570,758	10,918,713	1,392,745	182,890	1,302,322	

IMPORTS OF MEAT INTO THE UNITED STATES.

Although the United States exported 1,143,357,441 pounds of meat and meat products during the fiscal year ending June 30, 1913, and is still exporting large amounts, mostly pork and pork products, oleo oil, and tallow, large imports of beef have been received since October, 1913, nearly three-fifths of it from Argentina. In October, 2,069,794 pounds of fresh and frozen beef were received from Argentina and passed inspection by the Bureau of Animal Industry; in November, 3,988,898 pounds; in December, 9,440,488 pounds; and in January, 8,935,797 pounds; and the total for the four months is 24,434,977 pounds. During the same time from other countries were received 17,729,621 pounds of fresh and frozen beef, and the total from all countries thus becomes 42,164,598 pounds.

During the four months the imports from Argentina included also 537,943 pounds of fresh and frozen mutton, 177,801 pounds of canned beef, 1,268,887 pounds of oleo stearin, and 470 pounds of edible tallow.

The total meat and meat products imported from Argentina during the four months and not condemned weighed 26,420,078 pounds. Only 1,278 pounds of Argentine beef were condemned as unfit for consumption. The details of the imports of meat and meat products into this country from Argentina and from all countries in the aggregate during the four months from October to January just past may be found in Table 21.

Two-fifths of the imports of fresh and frozen beef during the four months came from Australia, New Zealand, Canada, Mexico, and Uruguay.

The present beef production of this country for one year, it is estimated, is somewhat less than 7,000,000,000 pounds, and the imports of fresh and frozen beef from all countries at the recent rate would amount to about 2 per cent of the national production; the imports from Argentina for a year at the present rate would be about 1.3 per cent of the national production.

TABLE 21.—*Meat and meat products imported from Argentina and all countries and inspected by the Bureau of Animal Industry, October, 1913, to January, 1914.*

Commodity.	All countries, 4 months.			Argentina.			
	Total.	Argentina.	Other countries.	October, 1913.	November, 1913.	December, 1913.	January, 1914.
<i>Not condemned.</i>							
Fresh and frozen:	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Beef.....	42,164,598	24,434,977	17,729,621	2,069,794	3,988,898	9,440,488	8,935,797
Veal.....	215,061		215,061				
Mutton.....	967,564	537,943	429,621		10,204	237,422	290,317
Goat meat.....	1,364		1,364				
Pork.....	488,761		488,761				
Total.....	43,837,348	24,972,920	18,864,428	2,069,794	3,999,102	9,677,910	9,226,114
Canned:							
Beef.....	2,181,629	177,801	2,003,828		31,025	130,176	16,600
Veal.....	6,622		6,622				
Mutton.....	11,544		11,544				
Pork.....	27,118		27,118				
Other.....	119		119				
Total.....	2,227,032	177,801	2,049,231		31,025	130,176	16,600
Cured:							
Beef.....	338,001		338,001				
Mutton.....	2,007		2,007				
Pork.....	1,137,606		1,137,606				
Total.....	1,477,614		1,477,614				
Sausage.....	259,546		259,546				
Compound.....	41,623		41,623				
Oleo-stearin.....	1,943,699	1,268,887	674,812	46,070	63,709	546,588	612,520
Oleo oil.....	28,822		28,822				
Oleomargarine.....	12		12				
Lard.....	20		20				
Beef extract.....	33,120		33,120				
Edible tallow.....	44,042	470	43,572				470
Total, not condemned.	49,892,878	26,420,078	23,472,800	2,115,864	4,093,836	10,354,674	9,855,704
<i>Condemned.</i>							
Total.....	181,712	1,278	180,434		462	816	

SUMMARY.

The conclusions of the subject may be briefly assembled. Imported Argentine dressed beef adds to the national supply of the United States, at the recent rate, a little over 1 per cent. While some of this meat has come from British frigorificos at Buenos Aires, a great deal of it has been consigned by the Buenos Aires frigorificos of the Chicago slaughtering and packing companies, to themselves at New York for sale by themselves in New York, or wherever they please to send it by rail. It is not assumed that they are using Argentine beef to beat down the prices of Chicago beef.

Practically, the Argentine beef that has come to this country has relieved the London market of just so much downward pressure, and Argentine dressed beef is about four-fifths of the imported supply of the United Kingdom, or one-third of the national consumption of beef. As between the United Kingdom and the United States, Argentine dressed beef is free to go to the better market. In this country it is competitive, if it is really competitive at all, only with the lower grades of domestic dressed beef.

Cattle in Argentina are not more numerous than they were five years ago, and perhaps they are less numerous. That country can not increase its beef supply permanently until the slaughter first ceases to increase or actually lessens sufficiently to give its herds liberty and time to increase.

COLONIAL COTTON.

By GEORGE K. HOLMES.

SUPPLEMENTARY TO THE AMERICAN CROP.

Notable efforts have been made to stimulate the production of cotton in colonies since 1903 by the British Cotton Growers' Association, and, on a less extensive scale, by the German Colonial Economic Committee, by the Colonial Cotton Association of France, by the Industrial Association of Lisbon, by the Cotton Industrial Association and Cotton Exchange of Italy, by the Netherlands Cotton Growing Association, by the Belgian Cotton Association, and for Spain by the National Industrial Propaganda.

Ten years ago the fear of the European spinners that the United States cotton crop would be insufficient for their uses led them to begin this extensive movement. As the annual report of the British Cotton Growers' Association for 1912 states, "if the climatic conditions were always favorable in the United States this association might never have come into existence. One of its main objects, and that of the German, French, and other similar associations, is to extend the cultivation of cotton throughout the world and broaden the basis of supply, so that the failure of the crop in any one particular country will be balanced by a corresponding increase in other countries. The broader the basis the broader the supply, with a consequent greater steadiness in price."

The year immediately antedating this great movement is 1903. Table 22 has been compiled to show the colonial production of cotton in that year and also in every following year to 1912. The British efforts have been especially active in Nigeria, Nyassaland Protectorate, Uganda, British East Africa, and the Anglo-Egyptian Sudan.

The German efforts have been made mainly in German East Africa and in Togo. In the British African countries mentioned 7,263 bales of cotton were produced in 1903, 42,266 bales in 1907, and 50,988 bales in 1912, an increase of 35,003 bales from 1903 to 1907 and an increase of 8,722 bales during the last five years. In the British West Indies cotton production increased from 866 bales in 1903 to 5,492 bales in 1907, from which quantity the production fell to 5,048 bales in 1912.

Through the German association cotton production increased from 191 bales in German East Africa and Togo in 1903 to 2,365 bales in 1907, and to 11,224 bales in 1912.

In all the British colonies and in Anglo-Egyptian Sudan the cotton production of 1912 shows an increase of 13,201 bales over that of 1907.

If all of the cotton-producing colonies are combined, as they are in Table 22, it may be observed that their production in 1903 was 36,269 bales, and in 1907, 92,565 bales, or an increase of 56,296 bales in four years. In 1912 the cotton production was 102,890 bales, or 10,325 bales above the total production of 1907, five years previous.

Theoretically, an almost fabulous quantity of cotton can be grown in the colonies embraced in Table 22. Some of this cotton is quite similar to the Upland cotton of the United States, but much of it is of shorter fiber, while again cotton of long fiber is produced on the sea islands. But it is a large undertaking to induce the natives of these colonies to labor, and to labor during the long period of time required to produce a cotton crop; in some of the more promising of the colonies, great obstacles have been overcome, or need to be overcome, to transport the cotton to the seaboard. Some of the problems of this sort are gradually being solved. In some of the British colonies the producers are guaranteed a minimum price for the purpose of encouraging them to raise a crop.

The results of the efforts of the British and German associations, and in a less degree of the other associations, as exhibited in Table 22, emphasize the magnitude of their combined undertakings to produce enough cotton to supplement the American crop of 14,000,000 bales and over in any considerable degree. One county alone in Texas produced in 1909 77,000 bales, or three-fourths of the combined product of all of the cotton-growing colonies. There are many counties in Texas and other States that each produce from one-third to one-half of the colonial production.

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TABLE 22.—Colonial cotton production, 1903–1912.

[Computed to bales of 500 pounds gross, or 478 pounds of lint net. Egypt and India not included.]

National and geographic groups.	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
BELGIAN.										
Africa: Kongo¹.....	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>
	.....	.....	1	1	3	1	.....	1	.....	.....
BRITISH.										
Africa: ¹										
Nigeria.....	606	3,004	3,134	6,385	8,556	4,800	10,529	5,185	4,682	9,148
Nyassaland Protectorate.....	118	597	1,625	1,101	844	1,582	1,729	3,634	2,845	6,773
Uganda.....	.....	45	201	819	4,024	3,401	5,429	19,442	17,456	21,986
Other Africa.....	27	917	449	634	351	717	521	469	441	1,020
Total Africa.....	751	4,563	5,409	8,939	13,775	10,500	18,208	28,730	25,424	38,927
America: Mostly or entirely										
West Indies.....	866	1,653	2,508	3,290	5,492	5,776	4,303	4,989	6,392	5,048
Asia.....	1,012	1,490	1,962	3,920	4,774	4,352	3,840	5,639	7,940	9,122
Europe.....	285	345	340	348	443	364	379	411	392	975
Oceania ¹	1	18	79	54	82	89	90	110	165	125
Total British.....	2,915	8,069	10,298	16,551	24,566	21,081	26,820	39,879	40,313	54,197
DUTCH.										
Asia: East Indies¹.....	12,632	15,367	13,280	15,944	19,652	19,932	13,235	14,504	11,902	² 11,902
FRENCH.										
Africa¹.....	3	346	206	447	619	649	911	832	³ 1,742	³ 1,976
America: West Indies¹.....	1	13	7	14	10	26	12	12	8	² 8
Asia (mostly Indo-China)¹.....	13,693	15,269	18,117	11,082	15,877	20,968	14,146	9,451	8,709	² 8,709
Oceania¹.....	71	49	39	110	109	73	348	417	336	⁴ 923
Total French.....	13,768	15,677	18,369	11,653	16,615	21,716	15,417	10,712	10,795	11,616
GERMAN.										
Africa (mostly East Africa and Togo)¹.....	191	1,371	1,489	1,764	2,365	3,190	4,762	10,132	7,372	11,224
Oceania: Bismarck Archipelago¹.....	240	56	15	38	5	.....	.....	.....	.....	.....
Total German.....	431	1,427	1,504	1,802	2,370	3,190	4,762	10,132	7,372	11,224
ITALIAN.										
Africa: Eritrea.....	.....	43	62	.....	370	890	636	770	1,307	1,247
PORTUGUESE.										
Africa².....	6	179	518	282	431	241	468	209	576	576
Sudan, Anglo-Egyptian.....	6,517	15,097	19,441	17,782	28,558	24,170	13,222	13,238	17,3 ²	12,128
Total for countries mentioned.....	36,269	55,859	63,473	64,015	92,565	91,221	74,560	89,445	89,657	102,890
GRAND DIVISIONS.										
Africa.....	7,468	21,599	27,126	29,215	46,121	39,641	38,207	53,912	53,813	66,078
America.....	867	1,666	2,515	3,304	5,502	5,802	4,315	5,001	6,400	5,056
Asia.....	27,337	32,126	33,359	30,946	40,303	45,252	31,221	29,594	28,551	29,733
Europe.....	285	345	340	348	443	364	379	411	392	975
Oceania.....	312	123	133	202	196	162	438	527	501	1,048
Total.....	36,269	55,859	63,473	64,015	92,565	91,221	74,560	89,445	89,657	102,890

¹ Exports.² Year preceding.³ Production.⁴ New Caledonia alone, without Tahiti production.⁵ Imports into Portugal.

In connection with the foregoing study of possible new sources of supply it will be helpful to refer to the present principal sources of world supply of this crop. In Table 23 is given such a statement, with comparisons, so far as available, for decennial periods back to 1870.

TABLE 23.—*Production of cotton.*

Year.	United States.	Egypt.	British India.	Russia.	Peru.
	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>
1870.....	4,024,527	408,359			
1880.....	6,356,998	575,307			
1890.....	8,562,089	843,877	1,699,582		
1900.....	10,266,527	1,124,617	2,471,449	1,633,065	44,000
1910.....	12,005,688	1,548,713	3,600,837	2,102,570	76,869
1911.....	15,692,701	1,514,730	3,284,519	2,981,921	
1912.....	13,703,421	1,538,395	2,751,464	2,135,137	
1913 (preliminary).....	13,677,000	1,560,922	3,677,824	2,105,845	

¹ Not including Khiva and Bokhara.² Including Khiva and Bokhara.

CROP REPORTING SYSTEMS AND SOURCES OF CROP INFORMATION IN FOREIGN COUNTRIES.

[Paper read by CHARLES M. DAUGHERTY before a recent meeting of special field agents at the U. S. Department of Agriculture.]

Government crop reporting, or crop estimating, as distinct from census enumeration, has been a development, in all countries where it is practiced, of the past 50 years; and hence has been coincident with the marvelous expansion of the world's cultivated land, with the multitudinous improvements in farm methods and agricultural machinery, and with the wide extension of the means of transport and communication which have characterized that period. Even before steamship, railway, and telegraph had promoted rapid and voluminous interchange of commodities among nations, it had been recognized that a prompt, even though approximate, knowledge each year of the areas under the great food crops, of the condition of the plants at intervals during the growing season, and of the final results of the thrashings would be of great economic and commercial value; and although some tentative efforts were made earlier in the century, notably in England and France, to devise some trustworthy scheme of crop estimating, no satisfactory system of acquiring and popularizing such knowledge was evolved until the adoption in the United States of the crop-reporting system, which has now been in operation for the past 48 years. In France, it is true, the French Department of Agriculture in its yearbook publishes a continuous record of the acreage and production of wheat and potatoes each year since 1815, the year of Waterloo, to the current date. Up to 1882, however, the figures are decennial estimates for census years, and for the intercensal years merely office estimates, not based upon actual investigations in the field. Estimates of the French Department of Agriculture, based on the crop-estimating system proper, date only from 1882.

In Great Britain the official record of the area annually devoted to certain cereals, as estimated by the Board of Agriculture and Fisheries, extends back to 1866, but estimates of yields only to 1884. The

official figures, it may be added, are often supplemented by the private estimates of Sir John Lawes, who from experiments conducted at his experimental farm at Rothamsted and other data had worked out estimates of the annual area of wheat in the United Kingdom from 1852 to 1866 and of the annual production from 1852 to 1884. Combining the official and private estimates we have a continuous record of the surface under wheat and the yield in the United Kingdom from 1852 to date, but annual estimates bearing the sanction of official authority exist for acreage only from 1866 and for production from 1884.

The science and practice of crop estimating may therefore be said to have had its origin in 1866 in the United States. Within the next half century organizations for prompt estimation of areas, yields, and other valuable economic facts respecting agriculture were established in practically all the more progressive and commercially important countries of the world. Every nation of Europe, excepting Turkey, now publishes annual official estimates of the yields of a greater or less number of its crops. In Asia crop reporting systems gather more or less comprehensive data in Asiatic Russia, British India, Japan, and even in a few Provinces of China. In Africa the result of an estimating system is now available annually for Egypt, Algeria, Tunis, and two or three States of the Union of South Africa. On the Western Hemisphere annual estimates relative to the more important crops are made in Canada, the United States, Mexico, Argentina, Uruguay, and Chile, and official reports are issued annually respecting the cereal crops of each State of Australia and in New Zealand. As a rule the official crop-reporting organizations in the different foreign countries are under the control and form an integral part of the respective Departments of Agriculture, and though the methods of collecting the information and working out the results vary to some extent in the various Governments it is notable that the same fundamental principle underlies all systems, i. e., periodical reports made either directly or indirectly to the central Government by authorized voluntary correspondents resident in each of the smaller political divisions of a country and thoroughly familiar with local conditions. The reports are made on schedules formulated and furnished by the central Government.

The correspondents in the political subdivisions usually consist of one or more local administrative officials and a small number of other competent persons, distinguished as being representatives of agricultural societies or as being closely identified with the actual tilling of the soil.

Separate corps of correspondents analogous to the township and county correspondents and State and special agents of the United

States Department of Agriculture, do not exist; in other words, when in the prosecution of an inquiry several sets of schedules are returned to the department here one set is returned to the central offices abroad. To generalize respecting details of the various methods of collecting data in countries where the political organization of each differs from the others in the classification and nomenclature of its political subdivisions is, however, practically impossible. It would probably be of more interest to describe briefly the system of a single country—France.

In France the official crop-reporting organization consists, on the one hand, of an administrative bureau in the Department of Agriculture, and, on the other, of what may for convenience be called a corps of crop correspondents resident in each political subdivision of the country. The functions of the administrative bureau, in so far as crop reporting is concerned, are the preparation and mailing of schedules and the tabulation and publication of the results. The functions and organization of the crop correspondents, as compared with those of our own country, are somewhat peculiar. The political subdivisions of France, ranging from the smallest to the largest, are communes, cantons, arrondissements, and departments. No exactly corresponding subdivision of the territory of the United States exists, the nearest approach being townships, counties, and States. With the before-mentioned political subdivisions of the country in mind, the organization of the crop correspondents may be described as follows: In each rural commune (there are 36,222 rural and urban) is maintained an organization known as the communal statistical commission, consisting of the chief administrative officer of the commune, one member of the municipal council, and not less than three nor more than five farmers. In each rural canton, the next largest administrative unit, and of which there are 2,911 (urban and rural) in France, is a similar organization, known as the cantonal statistical commission—members, the chief administrative officer of the canton, the justice of the peace, other cantonal functionaries, and from three to seven prominent farmers. Each arrondissement, the next largest unit, is represented in this crop-reporting system by officials known as special professors of agriculture, and the departments by departmental professors of agriculture; both classes of professors have access to and a deliberative voice in the sessions of the communal and cantonal commissions, where their functions are largely of an advisory and supervisory character; both, in the crop-reporting system, perform the same supervisory functions in the arrondissements and departments as do the cantonal commission in the cantons.

For any periodical inquiry respecting areas or production, schedules prepared by the bureau above mentioned are transmitted through

the chief officers (prefects) of the 86 departments to each of the four classes of bodies which constitute the crop-reporting service of the Republic; i. e., to the communal commissions, to the cantonal commissions, to the special professors of agriculture in the arrondissements, and to the professors of agriculture in the departments. The most important duties relative to collecting the data and filling out the schedules now devolve upon the communal commissions. By the aid of communal cadasters—that is, permanent revised registers kept in the archives of each commune, showing the actual distribution of the surface of the commune among various crops, woodland, the average yield per hectare, etc., in a selected or cadastral year—the commissions fill out the schedules for their respective communes and return them to the prefects of the departments. The cadaster, it may be noted incidentally, is in many European countries a fundamental element in making estimates of both area and production; it enables an almost exact enumeration of areas to be made and, partly because of the rigid system of crop rotation followed, permit a very satisfactory estimate of yields. It is partly due to the cadaster that crop estimates in European countries are rarely, if ever, adjusted to census figures. The prefects, as rapidly as the completed schedules are received from the communal commissions, arrange them in groups by cantons and refer them to the respective cantonal commissions.

The province of any given cantonal commission is to revise and, if necessary, to correct the communal schedules and to combine the data they contain into a recapitulative schedule for the entire canton. The work of verifying and correcting the communal schedules is distributed among the members of the cantonal commissions in such a way that to each member is assigned those communes with which he is most familiar. He has the right to demand enlightenment on doubtful points from the communal commissions and to appeal to competent authorities for complementary information. The recapitulative schedules when completed for the cantons are forwarded through the prefects of the departments to the special professors of agriculture in the several arrondissements by whom they are in turn corrected, revised, combined into a recapitulative schedule for the arrondissements and forwarded through the medium of the prefect to the departmental professors of agriculture. Recapitulative schedules for the departments are then made up and submitted to the central bureau, where they are tabulated for the whole of France and published. The results of all investigations as soon as available are published in the official Journal of the Republic, issued daily, and later in the Bulletin of Agricultural Intelligence (monthly) published by the Ministry of Agriculture. The final and revised figures on the area and production of about 40 crops appear by departments in

the yearbook of the Ministry, published about 15 to 18 months after the harvest of the crops to which the figures relate.

The French system of estimating area and production, it is apparent, is one where the data gathered by a corps of reporters, most nearly resembling our corps of township reporters, are successively corrected, approved, and indorsed, before they reach the central office, by the crop reporters of each of the larger subdivisions of the Republic. The figures are always under the control of official bodies presided over by an official of the various political subdivisions of the country, and the process of arriving at a final result may be described as a cumulative one. Perhaps after all the radical difference between this system and that in force in the United States is that in France the correctional and revisional functions performed by the cantonal commissions and the professors of agriculture in the arrondissements and departments devolve in our country upon the Crop-Reporting Board, and that the final tabulation of the schedules, after they reach the Ministry of Agriculture, is more simple, since only one schedule from each of the 86 departments remains to be tabulated. The French system is in a broad sense typical of that practiced in some other foreign countries, particularly in countries having cadasters, but it has been cited here not so much from that fact as to illustrate the variations in crop-estimating systems which may arise from differences in the political constitutions of governments, from geographical and climatic causes, and even from the mental attitude of a people toward government and economy.

In Great Britain, for instance, the schedules prepared in the Board of Agriculture and Fisheries are primarily turned over to the Board of Trade. Agents of the last-named board, known as collectors of inland revenue and stationed throughout the various counties, mail them to the farmers in their respective jurisdictions. When filled out the schedules are collected by these agents, and through the Board of Trade returned to the Board of Agriculture for the elaboration and publication of the data. In Argentina estimates of the Department of Agriculture on production of wheat, flaxseed, oats, and barley are made from returns of thrashing-machine operators, but the figures of nonthrashable farm products are collected by means of crop correspondents. In Sweden the preliminary estimates of the yield of wheat and other cereals are based on the natural increase from the seed; i. e., without reference to acreage, the total yield is estimated to represent an increase of fifteenfold, seventeenfold, twentyfold, etc., of the seed sown.

In the work of the United States Department of Agriculture the foreign crop statistics, used mostly in compiling estimates of the so-called world's crop, in answering verbal and other inquiries, and in

varied research work, are for the most part the final estimates emanating from and published by the crop-reporting bureaus of foreign Departments of Agriculture and other official organizations, whose functions embrace that class of work. Although identical data, excepting for the great food crops, are seldom in existence for all countries, and although there is great variation in the number of crops reported on by the different governments, the estimates, as a whole, cover a wide range; and embrace areas sown, quantities of seed sown per unit of surface, areas destroyed by winter kill and other causes, areas harvested, periodical condition of the crops, total and per capita production, in terms both of units of measurement and weight, average yield per unit of surface, percentage of loss due to drought, hail, floods, vermin and other causes, total and per capita consumption, cost of production, average monthly and annual prices of farm produce, and other data. The estimates used are preferably the final ones published in the yearbooks of the respective governments; for the smaller divisions and islands of the great Empires—British, German, French, and Dutch—the figures are usually taken from the Statistical Abstracts and other publications of the mother countries. The larger divisions of the British Empire—Canada, Australia, and British India—it may be noted, have crop estimating organizations of their own and issue yearbooks and other periodical publications relative to the crops of their respective territories. The yearbooks of many foreign countries, however, are not published until from several months to two years after the crops to which they relate have been harvested. In such cases it is necessary to utilize for current data preliminary and sometimes even unofficial estimates.

Preliminary estimates, of cereal crops especially, are made by practically all countries that have crop-reporting organizations. These are made and published in some countries before harvest and in others as soon after as possible. In those countries which publish an official daily gazette—as, for example, the *Journal Officiel* in France, the *Reichsanzeiger* in Germany, the *Wiener Zeitung* in Austria, the *Pester Lloyd* in Hungary, and the *Journal of Industry and Commerce* in Russia—these preliminary figures, immediately after they are compiled, are made available to the general public through the medium of an official organ. In some other countries they are first disseminated through small leaflets and afterwards published in greater detail in the succeeding issues of monthly or other periodical official bulletins such as are exemplified in the monthly *Technical and Economic Bulletin* published by the Department of Commerce, Industry, and Agriculture in Italy, the monthly bulletin of *Agricultural Intelligence* by the department of agriculture in France, and the *Bulletin of Agriculture, Mines, and Mountains* by

the Department of Agriculture, Commerce, and Public Works in Spain. Of course the official data, as soon as released, are widely copied by the unofficial agricultural and trade journals of the various countries, but in the careful work done by this Department it is required that in all possible cases the actual official figures only must be used.

In the foreign-crop work of the Department the presumably more accurate figures of agricultural censuses are of course utilized whenever available. Circumstances, however, limit their use within a narrow range. In some countries, among which populous British India is a notable example, no agricultural census has ever been taken; even in Great Britain none exists excepting that of 1908. In some other countries the intervals between census takings are of extraordinary duration, having extended in Argentina from 1895 to 1908; the last one in Russia was taken in 1897. Decennial censuses are taken regularly in France, Germany, and some other countries; in the quinquennial censuses of Denmark and Norway the areas returned under the various crops are utilized unchanged in estimating the crop production of intercensal years. From a statistical point of view it may be said in general that in most foreign countries the value of their agricultural censuses, particularly in their relation to the great food crops, is chiefly historical, but for the minor crops they constitute in countries which make no estimates respecting such crops the only existing official data. As has been previously stated, the annual estimates made by the crop-reporting systems abroad are seldom adjusted to census figures.

Other valuable sources of information on foreign crop statistics are the voluminous reports made to the Department of Commerce and published under the title of "Daily Consular and Trade Reports." Reports similar in character, but published less frequently, are made by the consuls of the United Kingdom, France, Germany, Austria, and other nations to their respective home governments. These reports—all of which are on file in the bureau library—contain, among other data, statistical information often not to be found in the official publications of the countries to which the respective consuls are accredited—information which, though it may not have the stamp of official authority, often constitutes the latest or perhaps the only data extant upon a given subject. In a recent report of a Hungarian consul, for instance, appeared an estimate of the wheat crop of Brazil, a country for which neither official nor unofficial estimates have been heretofore available. For countries which have no official crop-reporting systems or for which no recent census figures are available, the consular reports constitute a prime authority.

The daily, weekly, and monthly trade and agricultural journals of the various countries are also fruitful sources of statistical information, especially respecting current market conditions, trade movements, etc. A few of them—notably the Times of London, the

Marché Française of Paris, and the Journal of Commerce and Industry of St. Petersburg—make and publish detailed annual estimates respecting the cereal crops of their respective countries which, in some quarters and on some occasions, meet with as much or more faith than do the official estimates. A feature of some of the great commercial journals, such as those usually referred to as “Broom-halls,” “Beerbohms,” and “Dornbusch,” is the publication of a compilation each autumn or early winter, giving the world's wheat crop of the current year by countries of production. These, of course, antedate all official compilations on this subject, and, though not suitable for permanent record, give the earliest indication of the probable supply as compared with previous years.

Foreign crop statistics, it may be added, when considered with reference to single countries separately, present a valuable record of the agricultural resources of each, but when the attempt is made to consider them totally as a unit, a lack of uniformity in crop-reporting systems, and differences in the methods of expressing the results, detract in some cases from their value. A striking illustration is found in the statistical statements of various countries respecting the condition of the crops during the growing season. In the crop reporting system of England an average condition is expressed by 100, and variations from the average by proportionate figures above or below 100. In Sweden an excellent condition is expressed by 5; variations from that standard are expressed on a descending scale from 4.9 to 1. In Germany an exactly opposite significance is given to the same figures, excellent being expressed by 1, good by 2, fair by 3, and so on. In some other countries the condition reports are expressed in descriptive terms, i. e., as excellent, good, fair, etc. The lack of uniformity, as illustrated by this example, detracts to some extent from the value of comparisons in other instances. The defect has attracted widespread attention. For many years the International Statistical Institute has at each of its triennial sessions passed resolutions advocating a concerted movement among the nations for uniformity. Many commercial and agricultural organizations have repeatedly indorsed the proposed movement, but having no power to put their desires into execution nothing tangible has ever been effected. The establishment in 1908 of an International Institute of Agriculture at Rome, where are assembled in continuous work delegates from all the great agricultural countries of the world, has now created a center from which, it is expected, powerful influences will constantly be exerted for improvement of crop-reporting services, for their extension to all countries, for uniformity of statistical statements, and for a general unification of methods of statistical work throughout the world.

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